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and
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The Outlook

Towards an Ideal

MANY have been the distinguished Americans who have, in alternate years, delivered the Wilbur Wright Memorial Lecture before the Royal Aeronautical Society. Two years ago this lecture was delivered by Mr. T. P. Wright, who gave an inspiring talk on aviation's place in civilization. In 1943 Dr. Edward Warner treated us to his views on post-war transport aircraft. That lecture has become a classic, largely because it laid down certain parameters which had hitherto been missing.

This year Mr. John K. Northrop takes us farther along the road to the ultimate ideal: the all-wing aircraft which has no drag-producing excrescences. Mr. Northrop has had very long experience in this particular field, and the company which bears his name has accumulated a vast store of knowledge, some of which he now places at the disposal of the world in general through his Wilbur Wright Memorial Lecture, the first part of which is summarized in this issue.

Of very great interest is Mr. Northrop's comparison between the all-wing and the orthodox types of aircraft. There are many who have wondered whether the benefits to be derived are really worth the trouble of finding solutions to the many problems with which the all-wing is beset. With so many years of experience behind him, Mr. Northrop has no doubt in the matter. His figures indicate that the reduction in drag is capable of greatly increasing the range and payload. Even if some of the results which he foresees should take several years to achieve, there is sufficient advantage in those already attained to justify continuation—and indeed an intensification—of the development work. This should encourage British designers in general, and Mr. John Lloyd of Armstrong Whitworths in particular, whose machine is shortly to begin its test flights.

One of the drawbacks to the all-wing type, and indeed to all tailless machines, is the difficulty of obtaining a high maximum lift coefficient. Doubtless many will be shocked by Mr. Northrop's suggestion that it may be achieved by deliberately arranging the centre of gravity behind the aerodynamic centre of the wing, thus making the machine unstable longitudinally. This goes against everything we have been brought up to accept, but as Mr. Northrop points out, large aircraft will in any case require power assistance for operating the flying controls, and if the power system can be made completely reliable, with duplication, etc., such a scheme might work.

Pioneering Again

REFUELLING in the air is no novelty, but the series of trials just started may well set the official seal of approbation on the results of the development work which Sir Alan Cobham and his associates have been doing so patiently and persistently for the last 18 years or so. The early beginnings were crude, as pioneering attempts are apt to be, but improvement has followed upon improvement until there is now, from the technical aspect, every reason to consider the system really practical.

We have followed the work closely through the years, and have from time to time published articles on the procedure and equipment. A full illustrated description was given in our issue of August 23rd, 1945, and this was followed by a series of articles by Mr. Latimer-Needham, Sir Alan's chief engineer, who is accompanying Sir Alan on the present tests. It will, therefore, suffice if we recall that to make contact the airliner lets out a weighted cable into the bight of which the crew of the tanker fires a harpoon carrying a heaving line. The latter is hauled into the airliner and brings with it the fuel hose from the tanker. When the nozzle has been locked to the receiving cone, fuel is transferred by gravity, and when the tanks are full, contact is broken, the airliner goes on while the tanker returns to base.

The present set of trials is designed to ascertain the degree of certainty with which contact can be established between the two aircraft on an air route under actual operating conditions in all sorts of weather. In 1939 a series of flights were made over the Atlantic, between Foynes in Ireland and Gander in Newfoundland. The aircraft refuelled were Short flying boats, and all of the fifteen tests were completely successful.

Should the present trials prove equally satisfactory, and with modern radar aids in addition to the older methods there should be a good chance of this, there can be no doubt that refuelling in flight can have a profound effect on British long-range air transport in the near future. It may even be that several of the British aircraft types now coming along will, with the aid of flight refuelling, prove not only suitable but quite as economical in operation as, for example, unrefuelled American types on the Atlantic routes. Thus the handicap imposed upon British operators by the Government decision not to buy more American aircraft may be largely if not entirely nullified.

One aspect of refuelling in flight which appeals to us strongly is that it will do away with loading the airliner up to its maximum weight before take-off, and consequently will provide an extra safety measure in the case of one engine cutting at the most dangerous moment of a flight. The airliner will be flying relatively light until a good safe height has been reached.

The Economic Aspect

TECHNICAL reliability of refuelling in flight, and the added safety to passengers which it should bring with it, are in our opinion the two basic considerations upon which depends the claim to consideration of the system. On the economic side, however, the possibilities are also very promising. For instance, Sir Alan Cobham points out that an airliner on the transatlantic crossing, while carrying 50 passengers and their luggage, would require 12,000 gallons of fuel to make the journey in one stage. This fuel would weigh some 90,000 lb, and the machine would take off at overload weight. By refuelling in flight, the number of passengers could be doubled, and there would be no overload at take-off. Between London and New York, the extra revenue would be something like £5,000 and the cost of refuelling is estimated as about £750. If these figures can be substantiated, refuelling should be capable of turning an operating loss into a profit on routes entailing long non-stop flights. We know of no other way in which this could be achieved with safety to passengers.

The North Atlantic route is one of the most important, not only on account of its high traffic intensity, but also because of its prestige value. It is not, however, the only one. For instance, over the South Atlantic it is estimated that the Tudor II could increase its passenger payload from 26 to 48 by being flight refuelled en route between Lisbon and Natal. Figures such as these serve to explain Air Vice-Marshal Bennett's interest in flight refuelling and may also have a bearing on his recent public defence of the Tudor type of aircraft.

In view of the possibilities of refuelling in flight, this series of trials should be studied with the greatest care. They will be made in summer weather, but the tests to be made in the autumn in conjunction with B.O.A.C. should provide the answer to winter operation queries.

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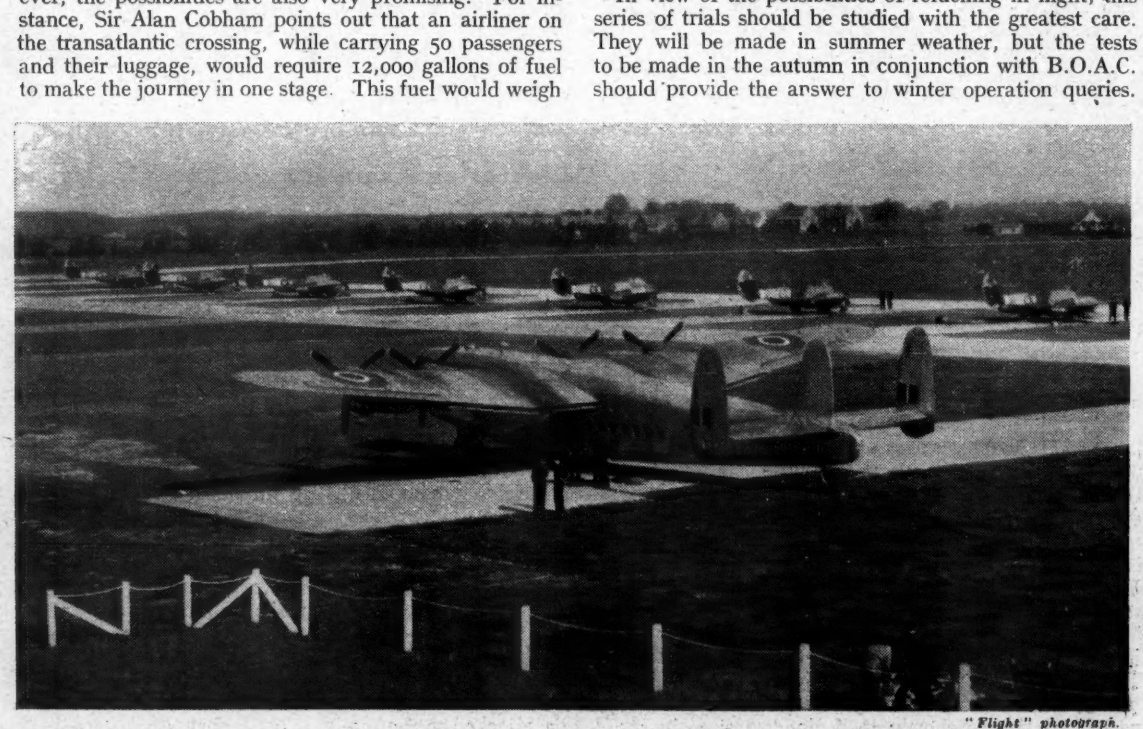


"Flight" photograph.

TOURING AND TRAINING: The Transport Command *York*, seen from the control building at Lubeck, Germany, carries correspondents on a tour of B.A.F.O. stations, as related on the following pages. The Fighter Command Meteor IIIs are training in Army support and gunnery.

FIVE DAYS WITH B.A.F.O.

"Flight" Visits R.A.F. Units in Germany : Good Shooting by Meteors and Tempests—Part I

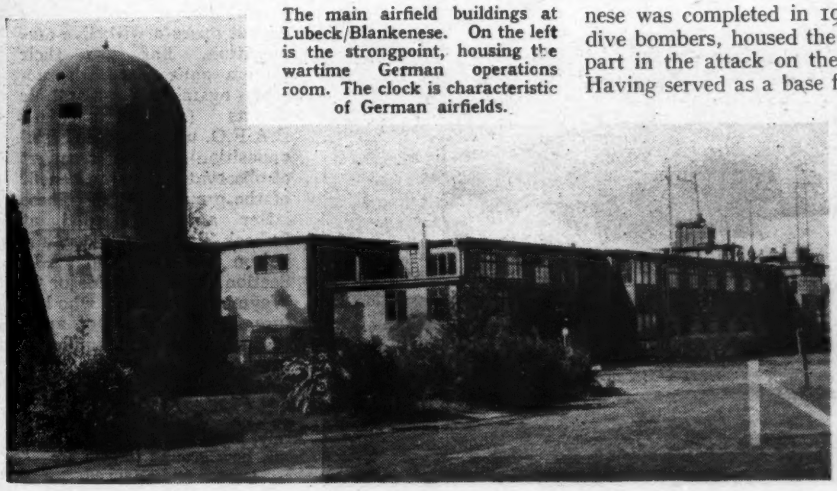
By H. F. KING, M.B.E.

Illustrated by "Flight" Photographs

YORK MW324, of Transport Command, fresh from the factory, and manned by five Flight Lieutenants and an Air Quartermaster, was the imposing vehicle which lately bore a party of correspondents to R.A.F. stations in the British Zone of Germany. Two hours twenty minutes after leaving Bassingbourn, her captain, F/L. Wood, having cautiously avoided infringement of the Russian Zone (only a mile or so from the end of the 2,000-yard concrete runway) set her gently down at Lubeck, and with a score of Meteors as a background, G/C. M. M. Dwyer, Officer Commanding the R.A.F. Station, came forward to greet us.

During the day and a half we were to spend in Schleswig we were to discover that the Group Captain is not only an authority on the various aspects of the work of his Station, to which Fighter Command squadrons are attached for operational exercises and armament training, but that he is equally knowledgeable concerning local history, art and politics. This is no place to relate the romantic story of the old Hansastadt of Lubeck, but the history of the air station, and of the units which were based there, is of special interest.

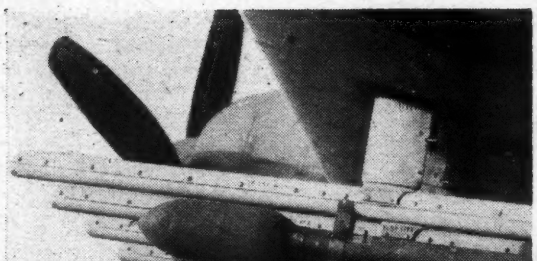
ON these pages a member of Flight's staff, who, by courtesy of the Air Ministry, has recently made a flying visit to the British Zone of Germany, relates his experiences at the operational training centre at Lubeck, and with No. 135 Wing, equipped with Tempest II fighter-bombers. Next week he will describe his visit to 140 Wing (Mosquito VI fighter-bombers), and to the gliding site at Oerlinghausen.



The main airfield buildings at Lubeck/Blankenese. On the left is the strongpoint, housing the wartime German operations room. The clock is characteristic of German airfields.

The airfield of Lubeck/Blankenese was completed in 1936, and after receiving Ju 87 dive bombers, housed the He 111s of KG 26 which took part in the attack on the Home Fleet in Scapa Flow. Having served as a base for the assault on Norway and Denmark, the station was turned over to training duties, but as the character of the war changed, Ju 88 night fighters were moved in for the defence of Berlin and Hamburg. During the last grim twilight of the *Luftwaffe* Fw 190 and Ar 234 fighter bombers, with Me 109s and Ju 88s, operated desperately from the field in their fight to stem the advances from west and east.

Among the more interest-



For their demonstration attacks on a Tiger tank each of ten Tempests IIs of Nos. 33 and 16 Squadrons were armed with 60 lb R.P.s (above). The 16 Squadron formation is seen on the right.

ing aircraft which used Lubeck were experimental two-seat Me 262 night fighters, a few battered components of which can still be found amongst the "junk" on the perimeter. The field was captured in dashing style by the R.A.F. Regiment, and was occupied by rocket-firing Typhoons. Later the Meteors of 616 Squadron moved up to be followed by Tempests and Spitfire XIVs.

Occupational Superscription

Since the permanent staff of the station, under G/C. Dwyer, took over in May, 1945, numerous "guest" squadrons have been accommodated. The inscription on a granite stone opposite the Station H.Q., originally commemorating the opening of the airfield by the late Reichfuehrer A. Hitler, was firmly obliterated by 124 Wing, who shared the Station with the present staff, and now tells of the British occupation.

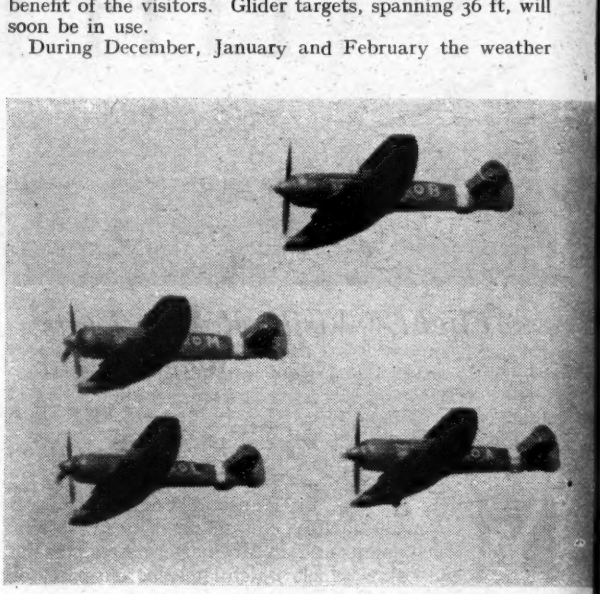
The Station buildings are dispersed in sparsely wooded country and bear the names of English and Continental stations which saw the changing fortunes of their new inhabitants between 1939 and V.E. day. They are roomy and comfortable.

To-day the principal function of Lubeck is to accommodate, each for two months, the day-fighter squadrons of Fighter Command. It has important occupational commitments, however, and is always standing by for any emergency operational role it may be called upon to perform. The squadrons usually arrive in twos, complete with their maintenance staffs, to undergo armament and close-support training, and their change-over with the units they replace is accomplished within 48 hours. Some 500 men are involved in each of these air lifts. At the time of our visit Nos. 1, 222 and 266 Squadrons, from Tangmere, were in residence, all equipped with Meteor IIIs.

Though the squadrons are not permanent, there is a flight of Martinets, which tow 24 ft sleeve targets for the benefit of the visitors. Glider targets, spanning 36 ft, will soon be in use.

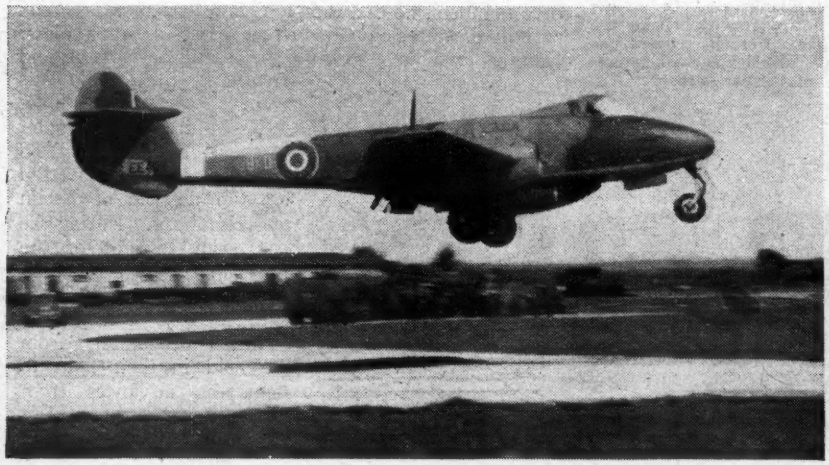
During December, January and February the weather

FIVE DAYS WITH B.A.F.O.



is often severe and there is little activity, but one Naval Squadron—No. 807, equipped with Spitfire XVIIIs—flew out during this slack period to spend two months with the Army.

While they remain at Lubeck, the visiting Fighter Command squadrons form part of B.A.F.O., and should a show of strength be needed, can be called upon to operate as a Wing. The first month of their training period is devoted to the study and practice of air support, for which purpose they engage in a mock war with the aggressive "Nordonians," whom they invariably sweep into the sea, just south of the Danish border, at the close of the exercise. During this phase the pilots do not operate with live ammunition, but use their camera guns to record successes against ground and air targets (neighbouring B.A.F.O. units provide aerial opposition), and their powers of observation for the benefit of the ground forces. These latter are represented at Lubeck by three army air-liaison officers, of 363 A.L. Section, headed by Major G. Weymouth, M.B.E., who lecture on all aspects of army co-operation and familiarize



A short-nacelle Meteor III pancakes after showing the Army, for the best part of an hour, how ground targets are located and attacked.

Centaurus-engined Tempest IIs of No. 33 Squadron stand-by prior to demonstrating the effectiveness of R.P.s, eight of which are carried by each aircraft. Visiting Thunderbolt pilots have expressed their admiration of the Tempest.

the pilots with tank and vehicle recognition, the organization and functions of ground formations, and similar subjects. The tasks of the fighters are made so realistic, and the Army is generally so helpful, that genuine enthusiasm is generated, as was evident at the briefing we attended. Resulting from this a "mortar emplacement" and attendant limbers, concealed in a quarry, were neutralized by Meteors.

These mock attacks have their moments. Just before we arrived, for instance, a Meteor, engaged on a contact car exercise, and doing 380 m.p.h., had lopped the topmost branches from a tree. The Meteor, incidentally, is proving very popular for low-attack work, though even with the belly tank, as generally fitted, remaining fuel and navigation must be closely watched. The pilot has an exceptional field of vision and, as was later demonstrated, the machine is a remarkably steady gun platform.

The syllabus for the second month of training calls for intensive practice in air-to-air and air-to-ground firing, live bombing and practice bombing, and R.P. attacks. Gunnery is practised on the ranges fringing Lubeck Bay at

Neustadt, and bombs are dropped into the Bay itself.

On the morning of our second day we saw how fighters work in conjunction with a forward control post and contact car. A "cab rank" of four Meteors was called up to deal with a variety of dummy targets, some marked by red smoke, and all—for the benefit of visiting Army officers—visible from the roof of the control building. The declared programme being completed, an "emergency call" went out that the airfield was under attack, and as shells (pyrotechnic effects by courtesy of the Army) burst round and on the control buildings, armoured fighting vehicles came crawling across the perimeter. Again the Meteors, with the sun glinting on their canopies, dived triumphantly to the attack.

To round off a good morning's work, S/L. Plagis, D.S.O., D.F.C., Officer Commanding 266 Squadron, acquainted the visitors with the recognition characteristics of the Meteor travelling at 500 m.p.h. and 50 ft. We all hoped that his aerobatics were enjoyed by our Russian neighbours. In return the Army presented for inspection one of its new American Chaffee light reconnaissance tanks capable of over 40 m.p.h. and armed with a 75 mm aircraft gun, as mounted by the Mitchell and used in the Pacific.

Gunnery Practice

Lunch over, and the Group Captain having shown us some of the beauties of the old town, we drove north-west over sunny country roads to the Neustadt ranges. Here, from his W/T vehicle, the range officer was in touch on a common frequency with an A.S.R. launch cruising in the sparkling bay at a respectful distance; with four Meteors, now orbiting in formation; and with Lubeck airfield. Leading the fighters—awaiting the signal to attack ten-ft-square ground targets—was S/L. Plagis. Having learnt that morning that this officer had already scored at least one "possible" (160 20 mm strikes with 160 rounds) during his stay, and that F/L. Osborne, D.F.C., had done the same, we looked forward to some good shooting.

A warning "red" having been fired in the direction of a careless fishing craft, the Meteors were brought in for their shoot. Later, as we took tea in the delightful little mess of the Range Detachment, Plagis's score arrived—156 strikes with 160 rounds. To achieve this sort of result, of course, the pilots take their time and make several runs

Rocket motors protrude from the cratered ground round the battered and burnt Tiger (left), and W/C. Holmes solicits G/C. Williams's opinion of the shooting (below).

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at the targets; but 266 Squadron may well be proud of its marksmanship.

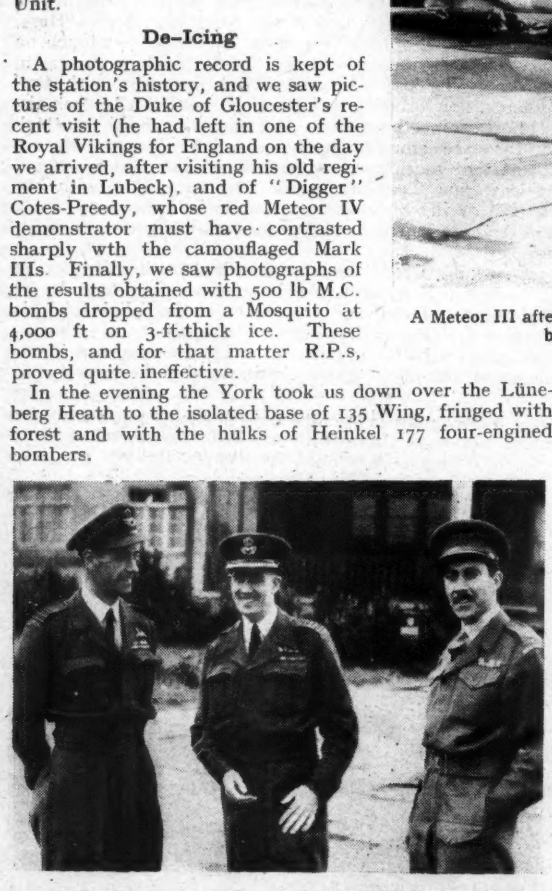
What better, after tea, than an hour in a fine German diesel launch over the bay, round the grim red-crusted wrecks of the *Cap Arcona* and *Deutschland* (both sunk—unhappily while laden with D.P.s—by R.P. Typhoons), past U-boat hulks and a battered Soviet tramp, to Travemünde, one-time base for Heinkel floatplanes and Dornier flying boats? Our 80-ton craft, still manned by its German crew, had been delivered during the war to Greece, journeying through the long waterways of Europe to the Mediterranean, west of Marseilles. She carries V.H.F., R/T and W/T, and she, or one of her sister craft, is always at five minutes' readiness for an A.S.R. call.

Before we left Lubeck G/C. Dwyer told us something more about his station. The Mosquito 36 night fighters standing in the sun, he explained, belonged to No. 85 Squadron, and were in Germany to exercise the B.A.F.O. reporting organization. Every two weeks the night-fighter element is replaced, and a night-fighter servicing unit is permanently accommodated on the airfield. Apart from a Forward Director Post and the Air Liaison Section, Lubeck houses an Air Formation Signals Unit (Royal Corps of Signals) and an Airfield Construction Servicing Unit.

De-Icing

A photographic record is kept of the station's history, and we saw pictures of the Duke of Gloucester's recent visit (he had left in one of the Royal Vikings for England on the day we arrived, after visiting his old regiment in Lubeck). and of "Digger" Cotes-Preedy, whose red Meteor IV demonstrator must have contrasted sharply wth the camouflaged Mark IIIs. Finally, we saw photographs of the results obtained with 500 lb M.C. bombs dropped from a Mosquito at 4,000 ft on 3-ft-thick ice. These bombs, and for that matter R.P.s, proved quite ineffective.

In the evening the York took us down over the Lüneberg Heath to the isolated base of 135 Wing, fringed with forest and with the hulks of Heinkel 177 four-engined bombers.



G/C. M. M. Dwyer (centre) with his Wing Commander Flying-W/C. F. M. Smith (left)—and Major Weymouth, Commanding 363 Air Liaison Section, Lubeck.

Commanding the station is G/C. M. D. F. Williams, D.S.O. The Wing Leader is W/C. J. W. E. Holmes, D.F.C., A.F.C., and the three squadrons—Nos. 16, 26 and 33—are commanded respectively by S/L. D. C. Usher, D.F.C., D.F.M., S/L. P. Ambrose, D.F.C., and S/L. R. N. G. Allen, D.F.C.

"One-three-five" is a special mobile Wing, and its mobility, as well as its operational effectiveness, was proved in a recent field exercise when the complete Wing moved to Ahlhorn and lived under canvas. Trips of this sort, far from being considered a "bind," are welcomed as offering a change of scene after the sombre isolation of the base. The same hospitality which we enjoyed was lately accorded some Thunderbolt pilots who arrived on one of the exchange visits, now becoming more common. They were unstinting in their praises of the Centaurus-engined "Temp. Two," and their enthusiasm is shared by the 135 Wing pilots, who consider it the best R.P. platform, other than the jets, in the Service.

A Meteor III after impact with a tree-top at 380 m.p.h. The pilot landed safely back at Lubeck touching down at nearly 200 m.p.h.

Next morning, on the miles-long, shell-strewn ex-German gunnery range at Unterlüss, we watched Tempests of Nos. 33 and 16 Squadrons fire a total of eight 60 lb R.P.s, with explosive heads, at a Tiger tank. This had lately arrived at the range in as-new condition.

Six aircraft of 33 Squadron were operating instead of the normal section of four employed in tactical R.P. attacks. Diving at about 30 deg and 350 m.p.h., they fired their rockets in pairs and soon altered the Tiger's outline. On an actual operation they would have been diving out of their echelon-starboard formation at any angle up to 60 deg and at a speed of 450 m.p.h. Their spacing would have been closer and they would probably have attacked from various directions.

The results obtained by "33" seemed to be equalled by four Tempests from 16 Squadron, which fired in salvo. In practice, of course, a lone tank would not call for a salvo; two well-placed R.P.s, either direct hits, or—as the blast carries forwards—just short of the tank, should suffice to render even a Tiger unserviceable for a long period.

A single Tempest brought its four 20 mm cannon to bear on the Tiger, but though the shooting was accurate and the ricochets amusing, this demonstration had little military significance.

The Tempests having returned to base, we tramped out to the target. A small fire flickered inside, though no petrol was aboard, and there was evidence of five direct hits. The surrounding earth had been churned and re-churned by impacts and explosions, and rocket motors jutted out at crazy angles.

The York now carried us on to Buckeburg, the main B.A.F.O. airfield for the A.H.Q. at Bad Eilsen. Buckeburg is the centre for a great deal of communication flying, which unfortunately conflicts to some extent with B.A.F.O.'s operational commitments. Group Captain A. E. Clouston, D.S.O., D.F.C., A.F.C., is in command.

At the headquarters of the Air Officer Commanding-in-Chief, British Air Forces of Occupation—Air Marshal Sir Philip Wigglesworth, K.B.E., C.B., D.S.C. (these are in the building formerly occupied by the Focke-Wulf design office, headed by Kurt Tank), we were received by A.V-M. A. L. Paxton, C.B., D.F.C., and by G/C. K. B. B. Cross, C.B.E., D.S.O., D.F.C., who explained the present B.A.F.O. set-up. There are two major tasks, said G/C. Cross, firstly of an occupational character, and secondly in keeping alive the tactical doctrines as evolved during the war. To a large extent these conflict and overlap.

The famous No. 2 Group is now disbanding, and 84 Group remains as the major operational formation. Apart from the B.A.F.O. units equipped with Tempest IIs and Mosquito VIs, there are squadrons armed with Tempest V, Spitfire XI and XIV, and others with the Mosquito XVI. This last type—the "little heavy bomber" which carried the 4,000-pounder to Berlin—has taken the place of the Mitchell as the tactical medium bomber.

At Gatow, in the British sector of Berlin, the Group Captain told us, there is a permanent Communications Flight, and one operational unit—either a flight of Mosquitos or a squadron of single-seat fighters—is always in occupation, remaining for a fortnight.

At various points in our tour we saw Auster air observation posts of No. 652 squadron.

(To be concluded)

S/L. Plagis, D.S.O., D.F.C., Officer Commanding 266 Squadron who has done some remarkable shooting.

PLASTIC WINGS

SIR BEN LOCKSPEISER, Chief Scientist of the Ministry of Supply, recently made the interesting statement that it was hoped shortly to produce an aircraft wing of moulded plastic with an internal paper honeycomb. The development is taking place under the direction of the Ministry, and one of the chief advantages of this new form of construction is to permit extra fuel storage space.

Sir Ben gave no specific details of this development or of the size or type of wing involved, but it would appear from the scanty facts given that a "lobster claw" type of structure fabricated in reinforced plastic may be on the road to practicality.

MECHANICAL ENGINEERING RESEARCH

SIR EDWARD APPLETON, Secretary of the Department of Scientific and Industrial Research, has announced that the Government, through his department, is setting up a special organization to carry out scientific research in mechanical engineering. The eventual annual expenditure on this project is expected to be in the region of £250,000 to £350,000. It was emphasized, however, that the maximum figure is unlikely to be reached for some years. The research work of the organization is intended mainly to supplement that of other national research organizations and it will be confined chiefly to fundamental problems.

Sir Edward said he hoped that the Dominions would send workers to participate and it was expected that a staff of about 600 would be employed, of which approximately 100 would be scientists.

Dr. G. A. Hankins, who designed the first supersonic wind tunnel available to the Allies during the war, has been appointed Director of the new organization and the Chairman of the Research Board is Dr. H. L. Guy. For the time being much of the work will be carried out at the National Physical Laboratory, at Universities and other Institutions, since the location of the research station has not yet been decided.

DEBABELIZATION: Col. Wang Chen-Fu (China) and Dr. J. Kalenda (Czechoslovakia) listening to speeches which are simultaneously translated at I.C.A.O. meetings.

A.R.B. APPOINTMENTS

THE council of the Air Registration Board has appointed Mr. R. E. Hardingham, A.F.R.Ae.S., to the post of secretary and chief executive of the A.R.B. and Mr. W. Tye, B.Sc., F.R.Ae.S., to that of chief technical officer.

Mr. Tye.

Mr. Hardingham.

Mr. Hardingham, who now succeeds the late Mr. Thomas as secretary, joined the A.R.B. at its inception in 1937, having previously served at the R.A.E., Farnborough, at de Havillands, and in the A.I.D.

Mr. Tye was with the R.A.E. from 1934 to 1938, returning there again during the war years, on airworthiness and design. He returned to the A.R.B. in 1943 and worked on preparation of British civil airworthiness requirements. He took part in the P.I.C.A.O. conferences in 1946 and 1947.

DE HAVILLAND PROGRESS

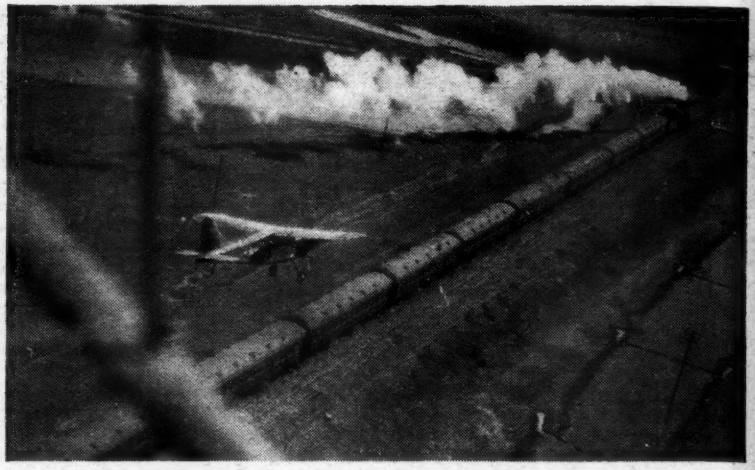
SOME interesting facts were disclosed by Mr. A. S. Butler, chairman of the de Havilland Aircraft Co., Ltd., at the general meeting on June 3rd. Of the Dove Mr. Butler said it had brought the company some £4 million of orders, mostly for export and largely to the hard-currency countries. An order for Mosquitoes, for the Turkish Government, was worth nearly £2 million.

The Vampire, already chosen by the Royal Swedish Air Force, had now also been adopted by the Royal Australian and Royal Canadian Air Forces, and the Swiss and other foreign governments were considering its adoption. Although the Vampire had been flown with larger jet units, such as the de Havilland Ghost and the Rolls-Royce Nene, the logical development was with a higher-rated version of the smaller Goblin engine. Mr. Butler said that for their later turbines the firm recognized the possibilities of axial flow, which was not sufficiently developed for adoption in the turbines of to-day.

Little could be said of the D.H. 106, but Mr. Butler made the interesting statement that estimates indicated that a pure-jet airliner, allowing for the large amount of work it could do in a year by reason of its speed, might prove to be on all counts a more economical proposition than the airscrew-driven transport of to-day.

By way of illustrating the firm's policy of giving associated de Havilland companies "dominion status," Mr. Butler mentioned that the Canadian company had started work on an economical single-engined freighter and general transport (picture in *Flight*, May 22nd), while the Australian company were designing an economical light transport in a category different from the Dove.

HERE AND THERE



"Thy Sentinel Am I": **A Stinson L5 acts as lookout for a trainload of U.S. Army personnel moving across China. Broken bridges and displaced rails can be easily spotted.**

Terminal Traffic

OVER 9,000 passengers a week on some 600 services are handled by the B.O.A.C. at Airways Terminal in London. Apart from its own services, B.O.A.C. deals with the traffic handling of B.E.A., B.S.A.A., and all the foreign airlines excepting K.L.M.

A Bramson Prang

SHORTLY after taking off from Kastrup airport, after a visit to his native Denmark, Mr. M. L. Bramson had to make a hurried forced landing in his civil Spitfire. The engine stopped and, as it was not possible to regain Kastrup, the Bramsonian Spit was belly-landed in a ploughed field on the island of Amager. A few coolers and things were rubbed off and the airscrew damaged, but Mr. Bramson was unhurt in body, although we believe he relieved his feelings in forceful Danish and English.

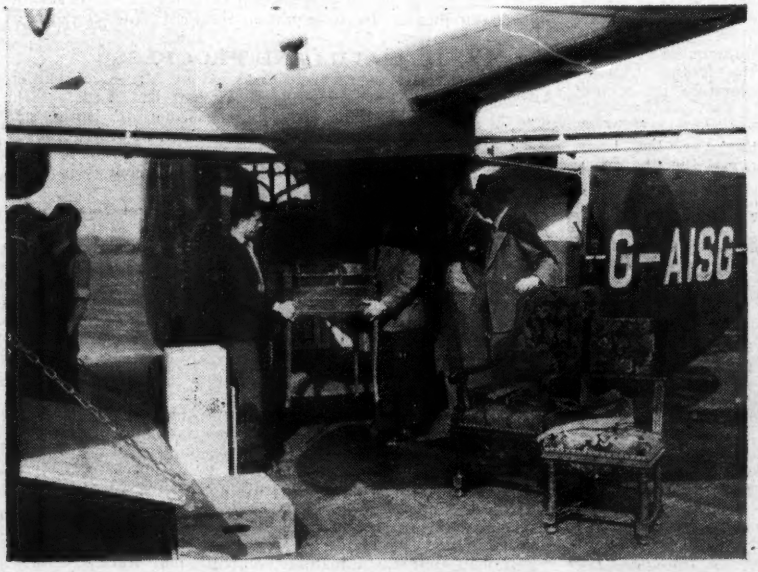
Training School

A NEW company, Airways Training, Ltd., has been formed by B.O.A.C. and B.E.A., to deal with the training of aircrews and ground crews. Pilots, navigators, radio officers, flight engineers, ground engineers, radio mechanics and flight controllers are to be trained at its school at Aldermaston, near Reading. The facilities of the school will also be available to all civil air transport operators.

Problem Freight

EIGHT men, including carpenters and engineers, took twelve hours to load pieces of freight on board a Scottish Airlines' Liberator recently. The freight consisted of machinery weighing 5 tons 14 cwt, valued at £1,500 and destined for Basra, where the motor tanker *British Sincerity* was laid up in harbour awaiting spares.

With a knowledge of the weight and dimensions of the seven large pieces and several smaller ones comprising the load, a complete scheme had to be drawn up so that the placing of the parts on the aircraft did not affect the centre of gravity.



A MOVING STORY: North Sea Air Transport Ltd., with their newly acquired Miles Aerovan, recently fetched an 1,800 lb load of Cyril Turner's (of Irving Airchutes) furniture from France to England. Compared with land and water transport the insurance premium was one third and delivery was in 36 hours instead of three months.

S.B.A.C. Display

THE Society of British Aircraft Constructors has chosen Radlett again this year for its Display, which is to be held from September 9th to 12th. It will be recollected that last year the general public was not admitted, as it was held that the approaches to Radlett were incapable of coping with large crowds.

French Air Press Entertained

THE Air Council gave a cocktail party in the Air Council Chamber, King Charles Street, London, S.W.1, last week, when the following members of the French Aeronautical Press were received: Gen. Chaffin and MM. J. Romain-Frugier, Delage, Blanc, Fevrier, Charriou, Laurent, Tournaux.

Ice Survey

AN air expedition will leave Russia next month to study the ice formation in Arctic waters. The expedition will pass on their information to the Soviet Union, which is planning to sail the first big passenger and transport ships in Arctic waters.

Appointments

FIRST Indian to fill the post of Assistant Air Liaison Officer to the India Office in Whitehall is S/L. B. K. Sen Gupta of the R.I.A.F. S/L. Gupta is twenty-seven years old and saw service on the Burma front.

Illness

HIS many friends in the aircraft industry will be sorry to learn that Mr. Eric Holgate, technical director of Titanine since 1923, is very gravely ill. If any of his old friends would care to write to him at 19, Sherwood Road, Hendon, N.W.4, Mr. Holgate would very much appreciate hearing from them.

Aluminium Merger

IT was announced last week that an agreement has been reached between Tube Investments Limited and Hawker Siddeley Aircraft, Ltd., to merge their aluminium interests. Over £5,000,000 will be involved in setting up a new holding company, jointly administered and in which each group will have an equal share. The companies involved in the arrangements are the Hawker Siddeley Subsidiary, High Duty Alloys, Ltd., and the Aluminium Division of Tube Investments, comprising the light alloy

HERE AND THERE

interests of Reynolds Tube Company and Reynolds Rolling Mills, Ltd.

Silver Jubilee

COMMANDER IVAN SMIRNOFF, of K.L.M., celebrated his silver jubilee as a pilot with the airline last month. During this period he has logged more than 27,000 hours flying time on world air routes.

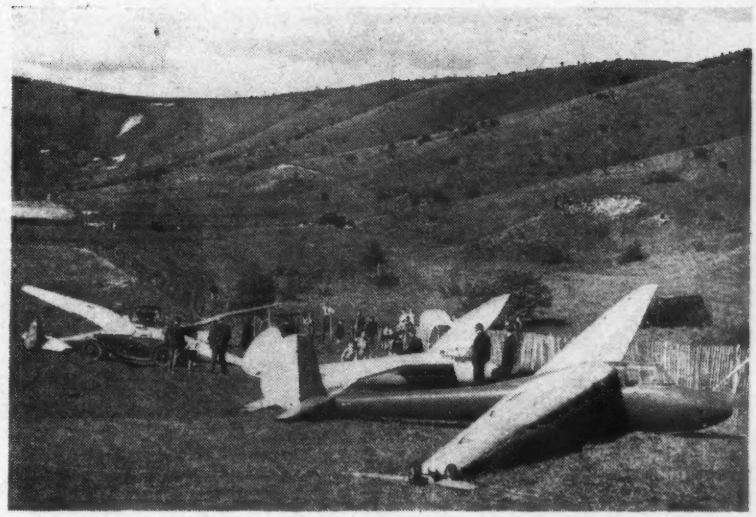
Whilst flying from Batavia to Australia in 1942, he was attacked by Japanese fighters, but despite several wounds, managed to crash-land on an Australian beach.

Portuguese Visitors

FOLLOWING arrangements made by the British Council, a party of ten Portuguese engineering students are visiting this country to see British engineering factories at work. The students, who are in the final year of their mechanical engineering course, recently made a tour of the de Havilland aircraft factories at Hatfield and Stone Grove, Leavesden, to see the production of jet and piston engines.

Strange Cargoes

IN Australia, flying "Noah's Arks" are becoming popular. Australian National Airways carried a mixed cargo recently, consisting, amongst other things, of 13 greyhounds, two sheep, a box of West Australian finches, a Shetland pony, and a bulldog pup. Now, 22 cows and 21 calves are to make the air trip from Tasmania to Melbourne in a specially fitted Trans-Australian Airline freighter which will accommodate six cows and six calves and make four round trips. Strange cargoes are not confined to Australia however, in America recently, a helicopter delivered to Southwest Airport two African snakes and six hawks, a consignment turned down by a road haulage firm.



FINE WEATHER FOR THERMALS: The London Gliding Club are busy most weekends flying many types of gliders from the Dunstable Downs.

Australian Scientific Adviser

MR. A. P. ROWE is to establish a scientific advisory committee for defence, in Australia. Mr. Rowe has been in Australia as the chief scientific officer of the long-range weapons organization.

Mosquitoes for Sale

THE Canadian Government are meeting difficulties in disposing of a hundred de Havilland Mosquitoes, manufactured in Canada and now surplus stores. The War Assets Corporation, the government surplus disposal agency, may ask for bids on the machines. Considered too expensive and too complicated for private flying, the aircraft are to be sold "for a song." It is reported that Argentina, China, Turkey and several other countries have declined to make offers for the aircraft. The R.C.A.F. is being equipped with Vampires.

Photography and Flood Control

AN area of 2,554 square miles, known as the Wadi Thartha and situated in the upper reaches of the river Tigris, is to be photographed from the air.

Hunting Aerosurveys have signed a contract with the Ministry of Communications and Works to undertake this task for the Irrigation Development Commission of the Iraq Government. The work is in connection with a proposed reservoir to hold the flood waters of the river Tigris which will then be released during the dry season. Indian surveyors are now working in the area obtaining ground control data, which together with the aerial photos will be utilized to obtain an accurate plan of the reservoir.

LIMP BLIMP: The U.S. Navy airship K 107 after it had fouled the framework of its hangar, tearing a hole in the envelope.

News in Brief

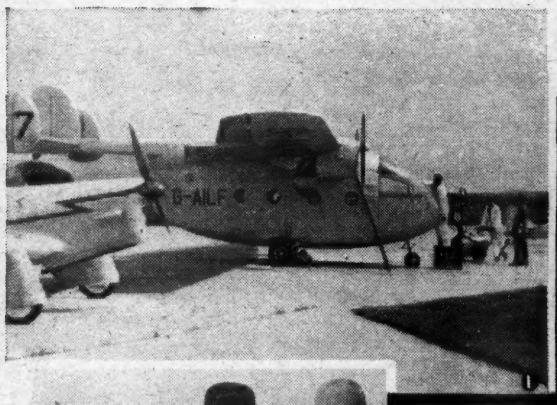
A MEETING of the Glasgow Model Aircraft Club will be held on Sunday, June 15th, at the Royal Naval Air Station at Abbotsinch. Rules and entry forms can be obtained from I. H. Mailer, 75, Walnut Road, Glasgow, N.

* * *

Mr. Edward Huskisson has retired from the position of general manager to Thomas Cook and Son after fifty years' service. At a luncheon in honour of Mr. Huskisson over a hundred representatives of the travel industry were present, and Mr. John Brancker, of B.O.A.C., expressed the thanks of the air transport industry.

* * *

The Aluminium Development Association has recently published a directory of members. This new publication gives a complete list to date of the member companies of the Association, with the addresses of their main, branch and sales offices, and particulars of associated companies. An index of products is also provided for the further assistance of readers.



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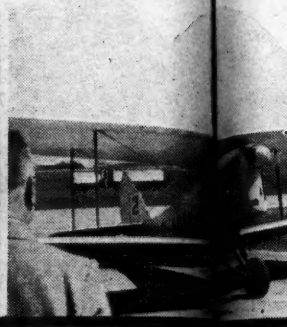

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1. A final polish for the Miles Aerovan, so ably flown by Ken Waller the company's chief test pilot.

2. Ken Waller tells of his experiences in the Air Derby.

3. After a faultless three laps, Somers and wife taxy in on their fast little Hornet Moth.

4. Bruce Campbell provides an autograph on a wing of the T.K.2 Moth.

5. Tommy Rose's winning Hawk under critical examination after the race.

6. "Now, where was that refreshment marquee?" Tommy Rose after winning the Manx Air Derby.

7. The Manx Air Derby Challenge Trophy, its replica and the Olley Challenge Trophy for the Tynwald Air Race.

MANX WEEK-EN

More Details of the Air Ra

BECAUSE of the very short time available before going to press last week, we had to be content with publishing a very brief account and the results of the I.o.M. Air Races. In fact, the Rally, Races and week-end holiday are all part and parcel of the affair. Although quite a large number of people flew over to Ronaldsway it is probable that many others would have taken a Whitsun vacation in this manner had they known what the Island had to offer. It is proposed to recount something of the events of the week-end as we saw them.

Douglas is, of course, the principal town of the Island, and is very well equipped to entertain the many holiday-makers who go there every year, and also the numerous visitors who collect for the Tourist Trophy races. However, a convention was taking place at Douglas over the Whitsun holiday, and in view of the town's greater distance from Ronaldsway airfield, Port Erin was chosen as the rendezvous for the flying fraternity.

Quaint methods of transportation are one of the features of the Island. In Douglas, horse-drawn "toast rack" or covered trams still trundle round the bay. Electric trams, reminiscent of those to be seen on the Continent, run round the cliffs to the north, and linking up the towns and the villages of the Island is a little narrow-gauge railway network with Emmett-like locomotives.

Organization of the programme of flying and entertainment was in the able hands of W/C. R. H. Stocken, F.R.Ae.S., acting on behalf of the I.o.M. committee. A variety of entertainments as guests of the Committee of

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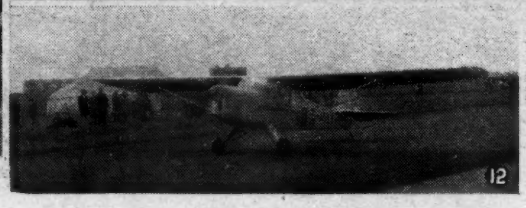

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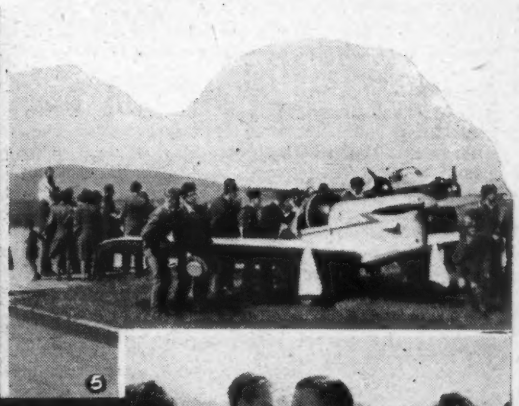
"Flight" photogra



IN RETROSPECT

Whitsun Entertainment

June Effort and Season Extension was available to those who wished to go to Douglas.

The *Flight* party, flying a Rapide, took off on the Saturday morning from White Waltham, carrying among the assortment of baggage a K-type dinghy. We had agreed to escort Mr. W. R. Scott's Moth Minor across the brine. Our instructions were to land at Speke, Liverpool, to obtain clearance to Ronaldsway, and except for a patch of very poor visibility in the Birmingham area, weather in transit was excellent, and the Minor joined us again at Speke. Here arose the only spots of bother of the week-end. First, although the tarmac hands were helpful and courteous, the contents of M.C.A. Notice to Airmen No. 124 (aircraft landing for clearance to Ronaldsway need not pay the landing fee) had not been communicated to them, and we were forced to pay our landing fee of 25s. Secondly, one would expect to be able to obtain a good meal in the canteen contained in the imposing airport building at Speke, but our request for lunch seemed to present no end of difficulty, and there was a long delay before a light lunch was produced for some of us. The staff, who seemed purposely stupid, were quite unable, after nearly an hour, to produce food for the Minor pilot or his navigator, and a request for a beer in the canteen resulted in a member of the kitchen staff issuing forth purposely to abuse us The adjoining room with open door, in which bottles were stacked, was apparently only a store, and the canteen it seems has recently been refused a licence. Next time we shall avoid Speke and try Squires Gate,

8. Second in the under 120 h.p. race was the Auster flown by Victor Spencer.

9. Portrait of the D.H. Technical School T.K.2 with Gipsy Major 10 engine which finished second.

10. Norman Haynes, scratch man, waits patiently for take off on his Beechcraft with 450 h.p. Wasp engine.

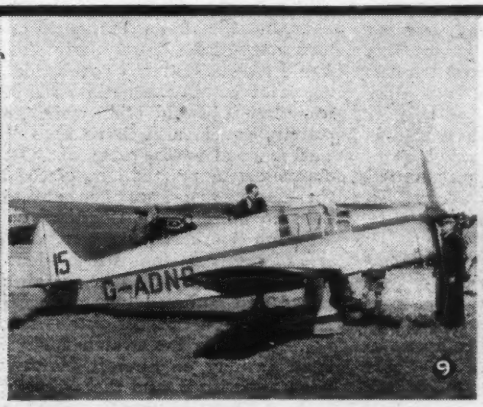
11. An excellent race was flown by R. Temple-Harris on his Proctor. A well-deserved fourth prize was won.

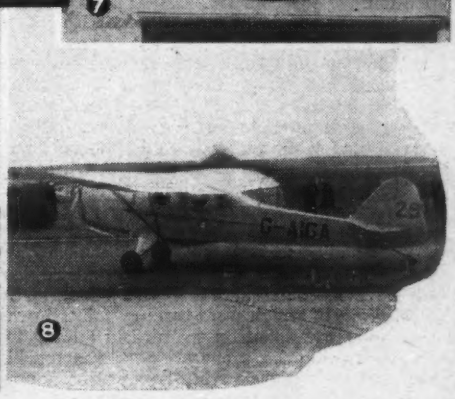
12. Winner of the Tynwald Race was W/C. McDowell on the Auster with Cirrus Minor engine.

13. The handsome cream Gemini which Hugh Kendall flew into third place in expert style.

14. Lord Londonderry watches for his smart blue Gemini which was unplaced due to failure to retract undercarriage.

15. His Excellency the Lieutenant Governor, A.V-M. Sir Geoffrey Bromet, a keen spectator, is seen with B.E.A. Captain Higgins.

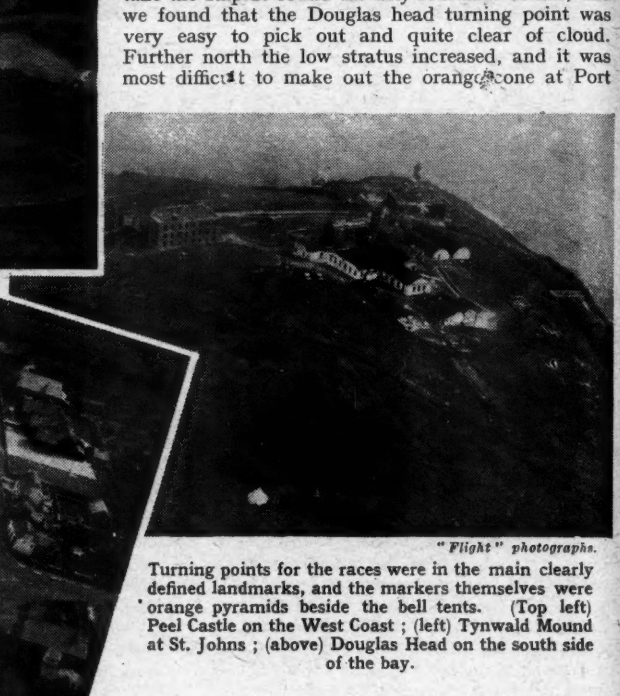




MANX WEEK-END IN RETROSPECT

Blackpool, of which good reports have been received.

Mist, haze and bright sunshine combined to produce instrument conditions over most of the Irish Sea crossing, and we lost touch with the Moth Minor after flying up the coast to Blackpool together to shorten the crossing. However, it arrived at Ronaldsway some time later, too late for the arrival competition. but having, like many others.



"Flight" photographs.

Turning points for the races were in the main clearly defined landmarks, and the markers themselves were orange pyramids beside the bell tents. (Top left) Peel Castle on the West Coast ; (left) Tynwald Mound at St. Johns ; (above) Douglas Head on the south side of the bay.

flown the sixty miles uneventfully. The last few miles to the Island were much clearer and we could see most of the eastern coastline and the 2,030ft summit of Snaefell while still about twelve miles out. We landed in the Rapide with less than a minute to spare for inclusion in the arrival competition.

Everyone was in holiday mood at Ronaldsway, and the brightly painted aircraft looked cheerful. High tea was provided by the Island committee and accommodation had been arranged for all the visitors who desired it at Port Erin or on the south-west side of the Island. Transport was a slight problem but several free buses ran a shuttle service and taxis could be called at short notice.

After a fill up and check up of aircraft, all were stowed in the hangars and we retired to the hotel for dinner. In the evening, the dance and party at the hotel was very successful.

On Sunday we set out to see some of the Island by land. The weather was still good and we drove over part of the T.T. course and then had a look at St. Johns and Peel, both of which were turning points in the race. The afternoon was spent on the airfield talking to competitors and watching the preparation of the machines. Some people did a few practice laps of the course to get the turnings "buttoned up."

Sunday evening was warm and clear so a party got together and cruised round the Calf of Man, the small island on the southern tip of the main island, in a smart little motor fishing boat. The rugged coast line, the millions of nesting gulls, the currents visibly churning or slicking the water, the arched Chicken Rock and the isolated lighthouse off the end of the land, all combined to make the little cruise an exciting and memorable one.

There were some misgivings at breakfast time on Monday when we saw the depressing grey clouds hanging low over the hilltops, but the weak front of which we had been warned, had apparently passed through during the night and it was not long before sunshine broke through. As early as possible, pilots and mechanics were busy with the competing aircraft, and it seemed likely that a modified course might have to be used to avoid the cloud covering the Tynwald Hill (St. John's) turning point. Before lunch we decided to take the Rapide round the fifty-four-mile course, and we found that the Douglas head turning point was very easy to pick out and quite clear of cloud. Further north the low stratus increased, and it was most difficult to make out the orange cone at Port Corna. The next turning point, which was announced at Bride Church, had been altered, and a cone on the airfield at Andreas substituted in its place. This airfield, nearby Jurby, the main R.A.F. station, and Ronaldsway, are the Island's three landing grounds.

Down the north-west coast the weather was bright and clear, but the air was extremely rough and we anticipated that competitors, particularly those flying light aircraft, would have a distinctly rough ride on this leg. The turning point within the outer walls of Peel Castle stood out well, but Tynwald Hill, while simple to place approximately, could easily have been "short-circuited." The marker stood on the green at St. Johns where, during an annual ceremony, the laws of the land are read out. On the last stretch from Tynwald to Ronaldsway the gap between hilltops and cloud was just sufficient for safety although South Barrule, a 1,580ft peak on the starboard side of the track, was still hidden.

Lunch was provided in the airfield canteen, and a fair crowd had gathered by starting time. First away was No. 29, V. H. Spencer on an Autocrat, who had 35 min 45 sec start on the scratch man. Handicap times, calculated entirely on aircraft performance and ignoring the pilots experience, and the average speeds are given in the table. Hales' Auster, No. 27, was next off. and Somers'

MANX WEEK-END IN RETROSPECT

and wife in their Hornet Moth followed. The Hornet had its tail up within a few yards and was very quickly off and round on its first course. Take-off direction was south-easterly so a left turn on to course of more than 100 degrees was required.

Although it was the lowest powered machine in the races, the Czechoslovakian Bibi, No. 19, was scratch man of the Tynwald air race. Its handicap was rather too heavy, and it was scarcely able to pick up any time. However, Mole was able to bring it in to third place.

As already recorded, W. H. Leadbetter, who did not fasten his harness, had a slight mishap and retired, and the Moth Minor was also forced to reduce speed over the rougher sections of the course. Mr. E. Wheatcroft and his pilot W/C McDowall were able to take the £50 first prize and the Olley Challenge Trophy home to Derby and the Harold Cash and Victor Spencer to secure the second prize of £30. E. F. Hales, an I.o.M. Auster entrant, was fourth in the low-powered race, winning £10.

Take-off of the Over 120s

First of the over 120s was the Aerovan flown by Ken Waller, whose take-off was distinctly spectacular. This "Dumbo" of aircraft was airborne after an extraordinary short run and making a very tight turn was quickly to be seen roaring away at low level over the hangars on the northern boundary. Less than a minute later, Esler's Messenger was off after the Aerovan, and the two Geminis, Lord Londonderry's attractive blue one just ahead of cream-coloured No. 8 flown by Hugh Kendall, were on the starting line. Although Kendall had coarser pitch airscrews he eased his Gemini into the air after the shorter run, and disappeared very low over the hangars. R. Temple-Harris handled his smart pale-green Proctor I very well indeed, and was the first of the three Proctors entered to get away. No. 17, the Sparrowhawk flown by G/C Bandit, took a rather longer run.

Before the three remaining aircraft took off Somers rounded the pylon to complete his first lap, and there was an anxious moment while the T.K.2 proved obstinate to start. Campbell taxied the machine to the starting line with a mechanic on the wing tip and was well away with Tommy Rose on the Hawk Six only 18 seconds behind. For quite four of the next five minutes Norman Hayman paced beside his Beechcraft anxiously waiting to get going, and eventually with a Harvard-like roar he too was airborne with five of the light aircraft having already completed their first lap.

Throughout the course of the race Somers was able to maintain his lead, and McDowell's Auster also remained in second place. Hugh Kendall's Gemini moved up consistently, but the blue Gemini with wheels down fell quickly behind. Temple-Harris' Proctor was obviously going very well and each lap saw him pass several more machines. By the end of the second lap the Hawk Six had passed the T.K.2 and both had left the Sparrowhawk behind, but at this stage it was still impossible to tell whether Tommy Rose and the T.K.2 would be fast enough to gain first and second place. They were, however, closing fast with the Aerovan which at that point had worked up to third place.

Waiting for the Winners

The tense minutes as everybody strained their eyes to see the winner approaching from the direction of Tynwald Hill were described last week. There was an amusing anti-climax however when the commentator, whose aircraft recognition was as often wrong as right, commenced an animated description of Somers' Hornet Moth approaching to win. The stray R.A.F. Tiger Moth, which the "winner" proved to be, landed on its second attempt just in time to clear the air for Tommy Rose, who kept his cream Hawk Six so low that he was approaching the airfield boundary before he could be seen. Close behind him was the silver T.K.2 which compared with a 200+ h.p. of the Gipsy Six had a high-compression Gipsy Major giving 142 b.h.p. at 2,550 r.p.m. Over a straighter course and in calmer air, the speed of both the machines would almost certainly have been higher, and the T.K.2 is rumoured to have a top speed of 190 m.p.h. Some seconds behind the winning machines came the Hornet and then Hugh Kendall's Gemini, both of whom won part of the £500 prize money, £40 and £20 respectively, generously presented by Mr. J. M. Cubbon. Temple-Harris' Proctor flew into fifth place and on the very line Hayman's Beechcraft snatched sixth place from Ken Waller in the Aerovan. Everyone agreed that the handicappers had done a very good job.

After all the machines had landed, the Bibi and Austers not without difficulty as a result of the fresh sea breeze which had sprung up, Ken Waller sportingly took up the Sparrowhawk and treated the crowd to a polished display of low-level aerobatics.

Most of the visitors who remained on the Island until the Tuesday morning went to Douglas on Monday evening, but the consensus of opinion seemed to be that a more informal and exclusive ceremony at Port Erin, with its friendly and congenial atmosphere, would have been preferably to the affair in the jitterbug paradise with its blaring dance band at Douglas.

COMBINED RACE PERFORMANCES

Take-off No.	Racing No.	Registration Letters	Aircraft Type	Pilot	Handicap Time	1st Lap Position	2nd Lap Position	Place	Av. Lap Speed, m.p.h.
1	29	G-AIGA	Auster ..	V. H. Spencer ..	—	II	II	II	101.0
2	27	G-AGXZ	Auster ..	E. F. Hales ..	1.26	III	IV	IV	94.5
3	2	G-ADSK	Hornet Moth ...	J. N. Somers ..	2.07	I	I	3	116.0
4	10	G-AGXV	Auster ..	W/C.A. McDowall	2.49	I	I	I	110.5
5	6	G-AFOB	Moth Minor	W. R. Scott ..	3.29	V	V	V	92.5
6	19	G-AGSR	Be550.BIBI	G/C. E. Mole ..	5.27	IV	III	III	101.5
7	7	G-AILF	Aerovan ...	K. Waller ...	8.30	2	2	6	121.0
8	3	G-AJJA	Monarch ...	W. H. Leadbetter	9.05	Ret	—	—	—
9	9	G-AILI	Messenger	E. Esler	13.57	3	3	9	128.0
10	14	G-AHNU	Magister ..	R. R. Payne ...	14.27	4	9	II	132.0
11	1	G-AIHM	Gemini ..	T. W. T. McComb	17.46	9	13	12	—*
12	8	G-AISM	Gemini ..	H. Kendall ...	18.15	5	4	3	140.75
13	28	G-AHVM	Proctor I ...	R. Temple-Harris	21.59	6	5	4	147.0
14	12	G-AHMV	Proctor I ...	B. Hill	22.23	7	8	8	145.5
15	11	G-AJMY	Proctor IV...	N. W. Fagg ..	23.09	10	10	10	145.0
16	17	G-ADGL	Sparrow-Hawk	G/C. Bandit ..	25.21	8	11	7	152.75
17	15	G-ADNO	Moth T.K.2	Bruce Campbell	30.11	11	7	2	179.0
18	4	G-ADGP	Hawk Six ...	T. Rose	30.29	12	6	1	181.0
19	18	G-AIHZ	Beechcraft	N. Hayman ...	35.45	13	12	5	186.5

** Wheels left down for 2 laps. No av. speed recorded.*
N.B.—Tynwald lap positions and places in Roman figures.

WIDENING THE FOUNDATIONS

AT the annual general meeting of the Hawker Siddeley Aircraft Co., Ltd., Mr. T. O. M. Sopwith, chairman of the company, explained that, no matter how good the group's aircraft and engines might be, future demands were unpredictable, and the directors had decided to widen the foundations of the business by devoting a substantial proportion of the turnover to motor cars, compression-ignition engines, light-alloy products, and prefabricated houses.

Mr. Sopwith said that the A.W. "flying wing" is about to start its trials; the Tudors are progressing, and trials have shown that they will meet, and possibly exceed, all the requirements of the original specification of performance; A. V. Roe, Canada, Ltd., have under development a most interesting high-speed 30-seater transport powered by two gas turbines; the Gloster Meteor, in full production for the R.A.F., has been ordered in considerable quantities from abroad.

On the subject of power plants Mr. Sopwith said: "Our gas turbine developments are proceeding on sound lines, and we feel assured of a most interesting future. In this field our first development is in the shape of a turbine-driven propeller. Two types of these turbines are in an advanced stage of development, and we are hoping to be able to commence production in the near future. We are, at the same time, developing the straight gas turbine similar to, but larger than, those in the 'Meteor.'"

Although Air Service Training, Ltd., was not an organization from which large profits could be expected, Mr. Sopwith expressed great pride in it, recalling that it was one of the most complete and successful air training universities in the world, and also capable of, and at present engaged upon, the manufacture of aircraft components.

American Newsletter

Slump in Light Aircraft Business : Production Scaled Down : Trends in Private Owner Types

By "KIBITZER"

IN a previous newsletter I tried to show some of the circumstances surrounding the temporary, but sharp, slump in the airline business of the United States. This depression was not confined to the airlines and the manufacturers of large aircraft. It embraced the builders of light aircraft, too, but for different reasons and possibly with more permanent results. Any depression must have its roots in many causes, but here the basic one seems to have been a completely unjustified and wildly exaggerated optimism, which not unnaturally resulted in either over-production or, in the case of some firms, a failure to meet technical obligations. Financial failure of some of the manufacturing companies followed. Unfortunately a few of the subsidiary industries, such as the distributors and agents for light aircraft, may yet follow suit.

It is extraordinary that so many people should have been caught out by what was so obviously an entirely false assessment of the possible market. In December, 1945, in almost the first of these newsletters, I expressed doubts about the wisdom of shooting for such a huge market as was being envisaged, while on May 16th, 1946, I wrote, ". . . . the writer is prepared to go on record as saying that if the American manufacturer of private-owner aircraft sticks to his present production schedules he is heading for a first-class slump. To someone on the outside it is quite impossible to see how all the machines to be built between now and December, 1948, are going to be absorbed . . . ."

I went on for a column and a half to give reasons why I thought this would happen. I also gave a list of the proposed production schedules for 1946, which showed that Ercoupes were expecting to build 10,000 machines; Taylorcraft 8,000; Swift 4,000; Republic 4,000 and so on. (In 1945 the estimates were far in excess of this, and were so fantastic that I won't repeat them now!) Anyhow, as I write to-day the Globe Swift company are, I believe, in the hands of the receiver and are virtually out of business, while Taylorcraft are not much better off, and every company is wondering what the future will hold.

Numbers Still Falling

To-day the total production for thirteen of America's largest manufacturers of light aircraft, for the first three months of 1947, were:—January, 2,179 machines; February, 1,832; and March, 1,724. Out of these thirteen manufacturers only three were listed as having had a constant increase in production for these same months. These were:—Beechcraft 1, 12 and 63; Republic 103, 126 and 133; Stimson 236, 247 and 255. All the other ten showed a decline, and even North American are reported as having closed down their Navion production pending a further examination of the domestic market. (Unkind rumour, never more of a lying jade than in the aircraft business, says they wish they had never built such a type, which is probably untrue and certainly unkind to a good little machine).

In the overall production field a survey shows that in the year April, 1946 to April, 1947, some 35,000 machines were built; the estimate had been 50,000. This year the estimated figure is 25,000 with 5,000 of them for export. To-day there are approximately 85,000 light aircraft in the hands of schools, private owners, and semi-commercial concerns. These machines are changing hands rapidly, far too rapidly for the good of the industry's health. This fact would seem to indicate that the domestic market will have difficulty in absorbing the 20,000 machines destined for it. On the other hand, given a decent overseas drive and some governmental assistance, the figures of 5,000 for export might be too low an estimate.

So much for the picture as it is at the beginning of May, 1947. But to find the causes one must go back to 1945. As the war neared its end, the American manufacturers, dazzled by the enormous orders received during hostilities and encouraged by the overwhelming part played by the Allied Air Forces, imagined that from then on everybody was going to fly in some way or other. This belief was supported by talk about the ex-Air corps and Navy aviators who would want to go on flying, and the thousands of cadets who would want to finish their training at civilian schools at their own expense. The attitude of certain government agencies supported these ideas, and impetus was further supplied by a government Bill which allowed free educational facilities for veterans, and which listed flying instructions as one of the courses which a returning soldier would choose under his "G.I. Bill of Rights." On the basis of all this it seemed too easy. Here was the great American "know-how," the factories, the machinery, and the men who build the aircraft, and towering above all, a vast section of the population who wanted not only to fly, but to buy their own machines.

Government Surplus

For a time all seemed to be coming to pass, but in an American Newsletter of January, 1946, I reported that the Government had disposed of 15,000 surplus light aircraft to dealers and private owners. Personally, I doubt whether this really did much to harm the light aircraft cause for the harm was there already, inasmuch as the other, and absolutely essential, facilities that must go hand in hand with the owning of a light aircraft just weren't available. Consequently this sale created some 15,000 pilots, or would-be pilots, at the flying schools, who found out, all too soon, that private flying wasn't what it was cracked up to be.

But the manufacturers either did not realize what was happening or were not deterred. Most of them went right ahead with their plans for producing, at fantastically low prices, up to 10,000 machines a year without appreciating that, if a man is to own an aircraft (whatever the first cost), not only must the machine be so safe that he can't kill himself, but he must have somewhere to keep it, someone to look after it, some means of getting to where it is kept, and last but not least, the ability to fly it from A to B and to finish up where he wants to go. In other words, private flying just wasn't a practical proposition then, any more than it is to-day. (Which is not to say that it won't be when we have helicopters for shorter journeys, or completely crash-proof aircraft, plenty of airfields, and such radio and other aids that any fool can go where he wants in any weather and without undue risk.)

Very soon, too, the difficulties of manufacturing the aircraft at the very low prices that had been quoted became obvious. Inflation and strikes took their toll. Production costs went up and up as the estimated delivery dates went back and back. All of which may, in fact, have been a good thing, for not only did it give a certain number of would-be buyers time to decide that, after all, they couldn't afford the new wife, the new car, the new refrigerator and, perhaps, the new baby as well as an aircraft; it also served to spread out the deliveries, which otherwise would have hit the available market all at once.

Anyway, by the autumn of 1946 some of the smaller

AMERICAN NEWSLETTER

manufacturers were beginning to cut down on their estimates, and by early spring of 1947 it looked rather as though it was only the previously contracted-for orders of the dealers that were keeping the production lines going. In fact, it was possible to go to some of the smaller airfields and see many unsold light aircraft sitting around on the tarmac. Undoubtedly the fine weather (which at the time of writing is still to come) will shift some of this back-log, but by now very many of the manufacturers have seen the red light—or worse—and are doing their best to recover what they can from the situation. Undoubtedly some of them (and at a guess this should include Aeronca, Beech, Stinson, Republic, Ercoupe, Cessna, Piper, perhaps North American, and others) will continue to have steady sales, but certainly not in the enormous numbers, or at the phenomenally low prices, that were quoted a year ago.

Looking ahead, I would think that the private-owner aircraft industry over here might develop along two distinct lines. The manufacture of light, Cub-like machines, which will be used for basic instruction and rental to those who just want to fly around their own airfields or within a radius of 100 miles; and the four-to-six-seater, fairly fast, single- or twin-engined aircraft that can definitely be used for cross-country work in all weathers. Distances over here are very great. It is nearly 3,000 miles from New York to Los Angeles via the southern route, and on that route one flies for nearly 1,000 miles over the State of Texas alone. Such neighbouring cities as New York and Buffalo, both in the same State, are nearly 300 miles apart, and it is over 1,000 miles from New York to Florida. For such a continent speeds of 180 to 200 m.p.h. are essential, and the minimum range should be 800 to 1,000 miles. Complete blind-flying instruments and radio are also a requirement if any bad-weather flying is to be undertaken (and official "bad" weather here is something that would give an aviator in England a touch of spring fever!). Consequently, the development of the cross-country, private-owner or semi-commercial, executive type of aircraft is here a very necessary requirement.

Assuming, therefore, that this forecast is correct, it follows that some of the present manufacturers will either have to change their types (for there won't be room for all the builders of the ultra-light), or go out of business—or perhaps amalgamate. Personally, I think that all these possibilities will be realized during the next two years. Some form of government subsidy may also be introduced, perhaps through orders from the fighting services, to keep all the firms in business, and discussions are under way at the moment to try to help forward the technical design of aircraft themselves, particularly as regards safety.

Standardized "Hire and Fly"

One other type of aircraft is a distinct possibility, however. That is the design, production and distribution through a company especially formed for the purpose, of a standardized "hire" aircraft. This machine would be specifically designed for this one job, and would be operated by a firm on a Continental scale It would enable a hirer to pick up a machine in New York and fly it to any other part of the States, leave it with a designated operator and, when he was ready to return, go back to the airfield, pick up an identical model and fly it home. Such a scheme operates well in the case of car-hire, and there seems to be absolutely no reason why it cannot be made to work in the case of aircraft. It is, moreover, the only answer to the man who wants to fly for business or pleasure, but who either cannot afford to own a machine outright or who is not prepared to put up with the present lack of facilities in the way of suitable airfields and maintenance. This lack of airports is something which is now realized by everybody, but unfortunately the halcyon days of ready money for aviation which followed the end of the war are over, and both Federal and State authorities, as well as private companies, are finding it difficult to raise funds for a business which has, at the moment, the unforgivable stigma of partial failure attached to it.

But such conditions won't last. Apart from a possible government subsidy, either for design or for actual production, I would think that by 1949 the light aircraft market will have had its over-optimism knocked out of it and will be following a down-to-earth policy—perhaps with fewer, and certainly much chastened, members—but with a programme which will enable it not only to meet its market obligations here, but to fulfil the equally important ones overseas. The machines that it will build will have all modern improvements, covering such things as full anti-spin characteristics, simplified controls, improved field of view, anti-fire precautions, de-icing, castering undercarriages; three- or four-bladed airscrews to reduce noise, full navigational aids, more rugged undercarriages with long travel, and certainly much lower landing speeds. Perhaps even a standardization of cockpit layout and component parts.

Work on Roadables

We may also see a decent roadable aircraft by 1949—a development which is going ahead fast here, and on which quite a number of manufacturers and private inventors are working. If, with all this, the airfield costs, the fuel costs, and the maintenance costs can be reduced, then we may see a reasonable market that is not immediately affected by every economic scare, by weather, or by every crash that is reported in the Press.

While on this subject I would like to see a high degree of standardization of many things connected with personal aircraft of all types; and, moreover, a standardization that is not confined to one nation or collection of nations. It is quite obvious that such a scheme could be utilized to lower production and maintenance costs, and our experiences during the war gave the clearest proof that standardized cockpits reduce the accident rate tremendously. Quite why the wretched private owner should be allowed to kill himself because every light aircraft is different inside, and he therefore pulls the wrong knob when he is coming in to land, remains one more of those saddening mysteries that plague us all.

But whatever the outcome of this present depression in the American aircraft industry may be, and whatever financial or company reorganizations result from it (and there will be quite a few), there will be benefits in other, and more permanent, ways. We shall see better appreciation of the overall problems: better designing, more economical aircraft, and, most important of all, the improvement of those ground facilities which are so vitally necessary to both the airline and the private owner, but to which much too little attention has been paid in the past. If, in 1945 and 1946, the aircraft industry of the United States had spots on its face from over-eating, its attack of mental and financial indigestion is now over and the purgative of the present recession has done it much good. Although the national characteristics of wild swings of public opinion, ranging from over-optimism to undue depression, tend to make the Americans learn their lessons the hard way, once learnt such lessons are generally well remembered.

FORTHCOMING EVENTS.

June 14th and 15th.—Royal Artillery Aero Club: Rally. Thruxton airfield.
June 14th.—Inst. of Physics: Summer Meeting. "Cathode Emission."
June 14th.—Air League of the British Empire: Display at Baginton airfield Coventry.
June 14th. and 15th.—Aero Club de Caen et du Calvados: Anglo-French air Rally.
June 20th and 21st.—Derby Aero Club: International air rally. Burnaston Airport.
June 21st to 29th.—British Gliding Association: National Gliding Contests. Bramcote airfield, Nuneaton.
June 21st. and 22nd.—Aero Club de l'Ouest de la France. International air Rally, Angiers.
June 21st. to 23rd.—Aero Club of Namur: International air rally.
June 22nd.—Swiss Aero Club: International model contests.
June 25th.—S.B.A.C. Annual General Meeting.
June 28th and 29th.—Luton Flying Club: Summer meeting, display and competitions.
June 28th to 30th.—Aero Club of Le Puy en Velay: Rallye Lafayette.
June 29th.—Auster Flying Club: Annual air rally. Rearsby airfield, Leicester.
July 2nd to 23rd.—Air League of British Empire: Blackpool (Squires Gate) Flying displays with R.A.F. support on 9th, 16th and 23rd.
July 4th to 20th.—Brussels International Aero Show.

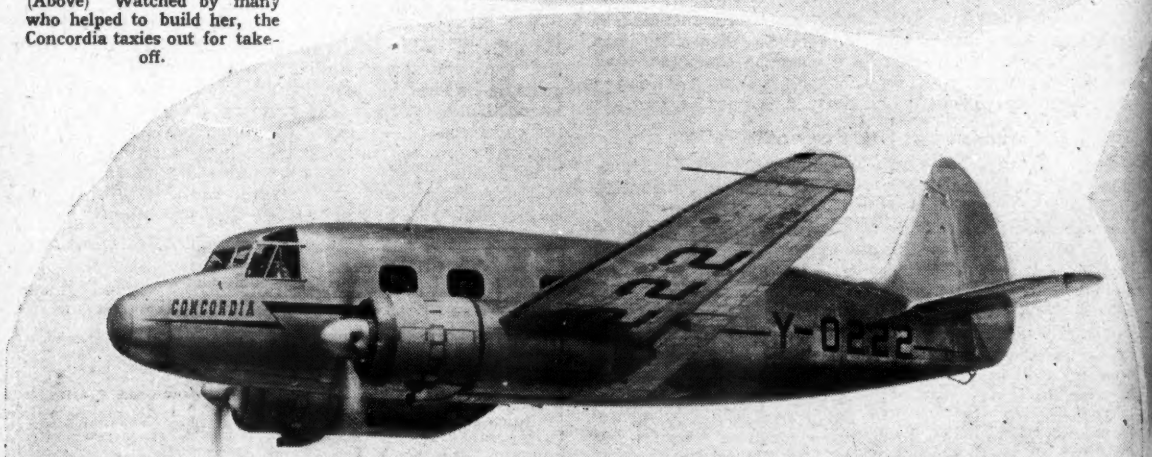
CONCORDIA VOLANTE

Air-to-Air Pictures of Cunliffe-Owen's New Feeder-Line Aircraft

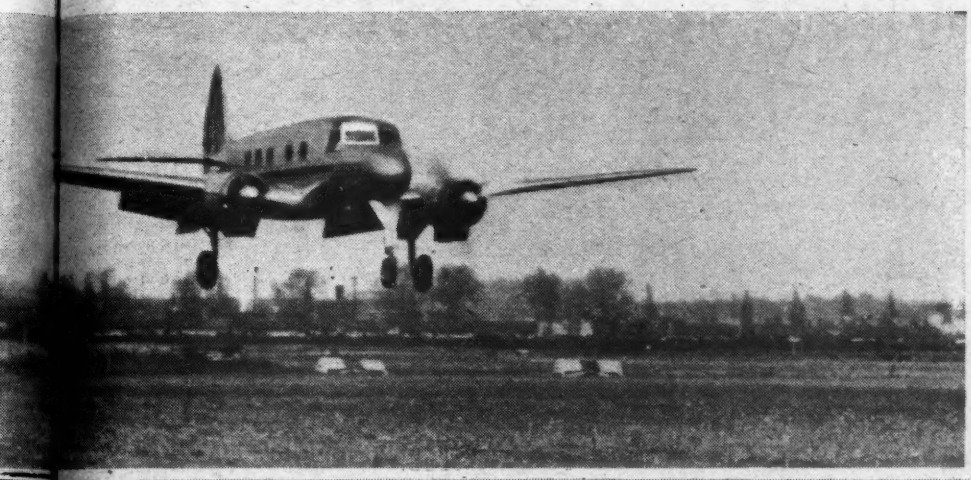
TAKEN shortly after the initial flight trials, the special *Flight* photographs on these pages demonstrably emphasize the contention, made last week in our appraisal of the aircraft, that the Concordia is a purposeful, good-looking machine. Aerodynamically it is clean; and in flight Mr. Aubrey Corbin, Cunliffe-Owen's chief test pilot, demonstrated that the aircraft is docile and well mannered. (The "blister" forward of the fin encloses a tail parachute for spinning trials; it is not a standard fitting.)

Although the estimated performance figures have not as yet been confirmed the Alvis Leonides 550 h.p. engines are designed to give the aircraft a maximum

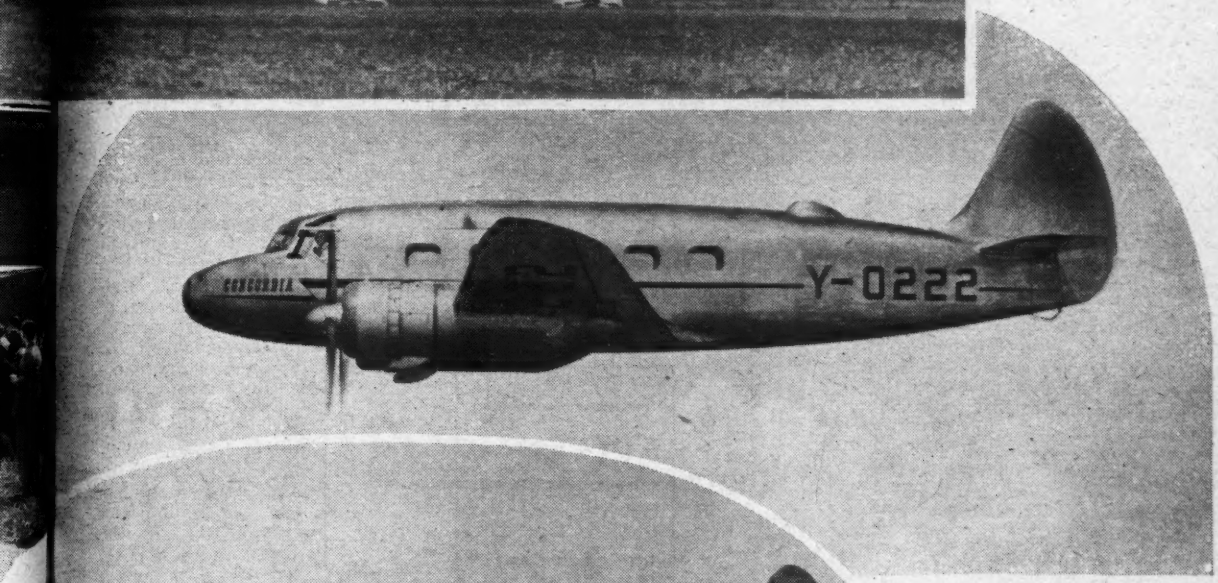
(Above) Watched by many who helped to build her, the Concordia taxies out for take-off.



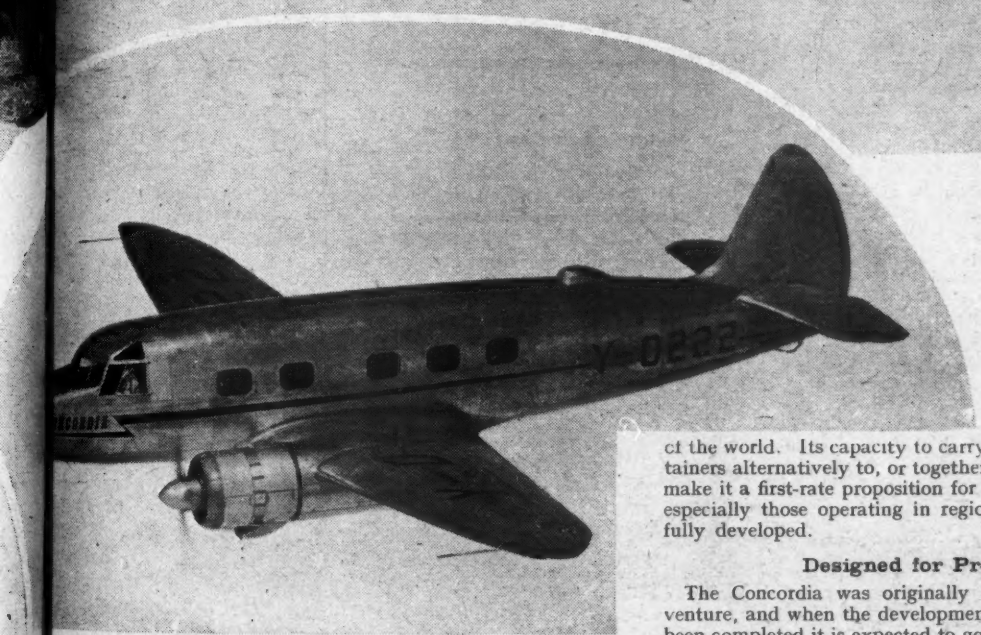
The Alvis Leonides engines fit neatly into the general lines of the Concordia and help to give a well proportoned appearance. The Oxford from which our photographer obtained these exclusive photographs also had Leonides engines.



Coming in to land in characteristic tricycle attitude, the Concordia exhibits her ample flap area.



(Above) The plane of the airscrews lies forward of the cabin and should conduce to a low internal noise level.



(Left) The commodious fuselage has a graceful shape and the whole appearance is well balanced.

speed of 216 m.p.h. and a maximum W.M. cruise of 194 m.p.h. At the latter condition the range is 920 miles with 1,930lb of payload, or 800 miles with 2,100lb payload, whilst at the maximum economy speed of 137 m.p.h., 1,930lb payload can be carried a distance of 1,130 miles.

Since the disposable load to tare weight ratio is 18.35 per cent (full fuel and oil), these figures should ensure for the Concordia a full and healthy future on the feeder lines of the world. Its capacity to carry freight in standard containers alternatively to, or together with, passengers should make it a first-rate proposition for charter companies, more especially those operating in regions of the world not yet fully developed.

Designed for Production

The Concordia was originally laid down as a private venture, and when the development trials have successfully been completed it is expected to go into service with British European Airways.

A very useful feature in present circumstances is that as a design for production the Concordia shows up very well. In view of this once production is started, delivery dates for the type should be fairly quick, and this is particularly heartening at a time when our need of exportable commodities is complemented only by our requirements for "hard" currency.

ALL-WING AIRCRAFT

Their Advantages, Development and Problems Outlined Before the R.Ae.S.

J. K. Northrop.

THE Wilbur Wright Memorial Lecture to the Royal Aeronautical Society is held annually, and the custom is to have a British lecturer alternating with one from abroad. For the last few years this has meant an American lecturer every other year. In 1941 the lecture was given by Juan Trippe; in 1943 by Edward P. Warner; and in 1945 by T. P. Wright. This year's lecturer was John K. Northrop, who is head of one of the most famous American aircraft firms. Its work on all-wing aircraft development goes back to the years before the war, and has now reached in size the XB-35 bomber of 172ft span.

THE thirty-fifth Wilbur Wright Memorial Lecture was delivered before the Royal Aeronautical Society last Thursday by Mr. John K. Northrop. The lecturer began by examining to what extent the all-wing type of aircraft is worth while, traced its development so far as his own company is concerned, and concluded by examining the more serious problems still outstanding and some of their possible solutions.

Mr. Northrop said there was a tremendous background of development in tailless aircraft, but little outside that of Horten brothers in Germany and of Northrops in America in the all-wing type. Improved efficiency was the factor which had inspired his company's work. The extremes in size explored and satisfactorily flown by Northrops to date ranged from the "buzz bomb" of 29ft span to the XB-35 long-range bomber of 172ft span.

Explaining the size of the bomber, Mr. Northrop said: "It is considerably larger than would be necessary to provide ample space for passenger and crew comfort and ample volume for payload, be it cargo or bombs. It was designed larger than necessary because we desired to keep the wing loading comparatively low in this first large experimental venture. It has a normal gross weight of 165,000 lb, an overload gross weight of 221,300 lb and sufficient volume within the wing envelope so that the maximum gross weight at take-off might well be increased to over 300,000 lb, somewhat over half of which could be devoted to bombs, fuel and miscellaneous payload. It may be seen, therefore, that there is a practical range of size within which the all-wing aircraft can be used. If the requirements of space and volume do not permit the full use of the all-wing principle, a rudimentary nacelle may be added without losing its economic advantages."

Comparisons

In comparing all-wing and conventional aircraft, Mr. Northrop made the assumption that spans of comparative aircraft having the same gross weight were equal, and that the comparison was confined to large bombers and transports with maximum velocities up to approximately 500 m.p.h. so as to neglect compressibility effects.

"Based on these assumptions and on the following proved data on the all-wing type, a comparatively simple analysis of advantages may be made.

"The ratio of the minimum parasite drag coefficient ($C_{D_{min}}$) for all-wing aircraft to that for conventional types is approximately 1 : 2. Minimum drag coefficients for a number of large bomber and transport aircraft average approximately 0.023. The minimum drag coefficients for several all-wing types have been measured both in model and full-scale configurations and vary from less than 0.010 to about 0.0113, which is the figure for the XB-35, including armament protuberances, drive shaft housings, rudimentary nacelle for gun emplacements, and so on.

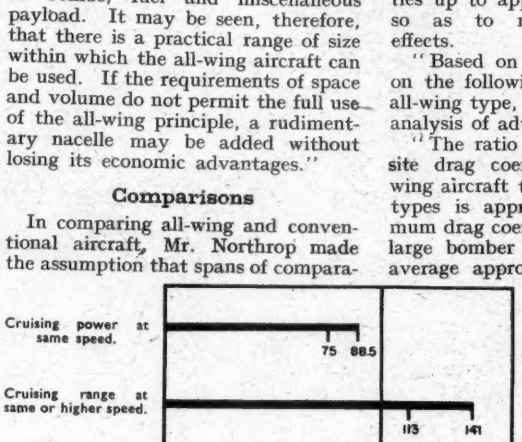


Fig. 2. Graph of performance characteristics of all-wing aircraft.

"The ratio of maximum trimmed lift coefficient ($C_{L_{max}}$) for all-wing to con

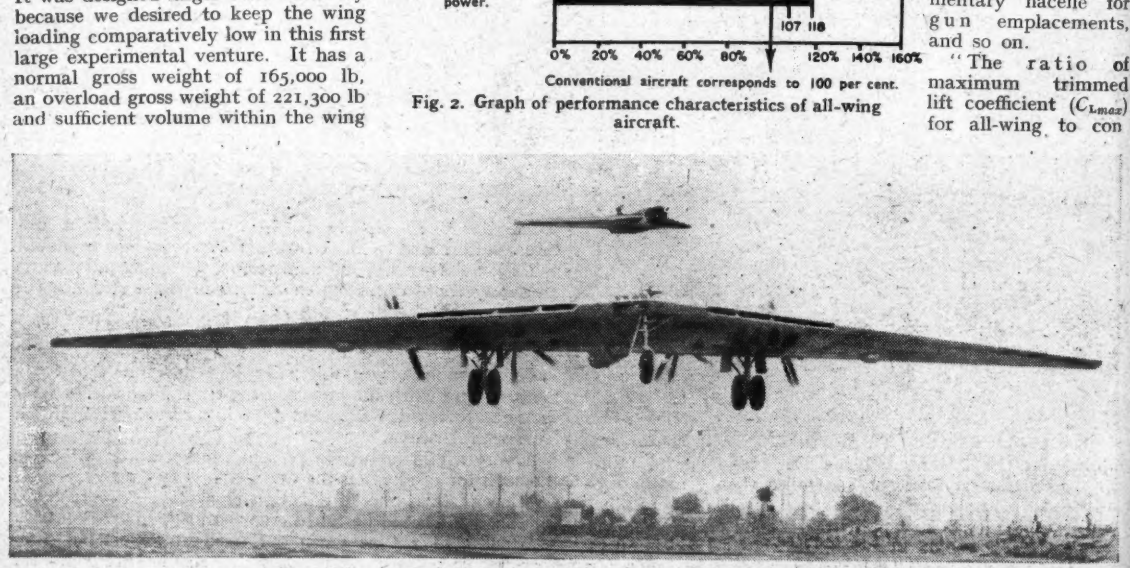


Fig. 1 The Northrop "Buzz" bomb and the XB-35 shown to scale.

ALL-WING AIRCRAFT

ventional types is approximately 1.5 : 2.3. The latter figure is typical for a number of the large aircraft of conventional arrangement previously mentioned. The former is readily attainable in a configuration such as that of the XB-35 and may be subject to considerable improvement through the use of several types of high-lift devices yet to be proved.

"For comparative aircraft of the same span and gross weight, the selection of the required wing area will depend either on flight conditions, including take-off without flaps, or landing conditions. If the flight conditions govern, the ratio of required wing areas of all-wing to conventional aircraft will be 1 : 1 because the two wings are equally effective except under conditions of maximum lift. If landing conditions govern, the ratio will be $\frac{2.3}{1.5}$: 1, assuming the same landing speed in each case. If take-off with partial flap deflection governs, the ratio will be somewhere between the above two figures.

"In large all-wing bombers and transports, and to a growing extent in conventional long-range transports as well, the ratio of gross weight at take-off to landing weight will approach 2 : 1. Therefore flight conditions are likely to govern the selection of wing area more than landing conditions."

Drag Reduction

Calculations were given which indicated that the total minimum parasite drag of the all-wing in terms of the conventional type will vary from 50 per cent if flight conditions govern, to 77 per cent if landing conditions govern.

"It is a well-known fact, based on the Breguet range formula, that with conventional reciprocating engines and airscrews the speed for maximum range is approximately that at which parasite drag and induced drag are equal. Therefore, at the same cruising speed as the conventional aircraft the all-wing type will require from 25 per cent to 11½ per cent less power, and with the same amount of fuel will fly from 33 per cent to 13 per cent farther.

"If the all-wing aircraft is operated at its most economical speed, instead of the most economical speed of the conventional type, it will fly 19 per cent to 7 per cent faster, and the range will be from 41 per cent to 14 per cent greater with the same amount of fuel.

"Under high-speed conditions with any type of power plant the parasite drag becomes a much larger percentage of the total drag than for cruising conditions with reciprocating engines. At high speed the parasite drag may account for 80 per cent or more of the total, while the induced drag drops to 20 per cent or less. Using an assumed figure of 80 per cent parasite drag, which is probably correct to ±10 per cent for most aircraft, the power required to drive the all-wing type at the same speed as the conventional aircraft will be from 40 per cent to 18½ per cent less, and the range, at the high speed of the conventional aircraft, will be from 66 per cent to 22 per cent greater. As turbo-jet and turbo-prop power plants both operate at relatively high speed for best fuel economy, the advantages of the all-wing configuration, when used in combination with these power plants, will closely approach the above figures for maximum range as well as high speed.

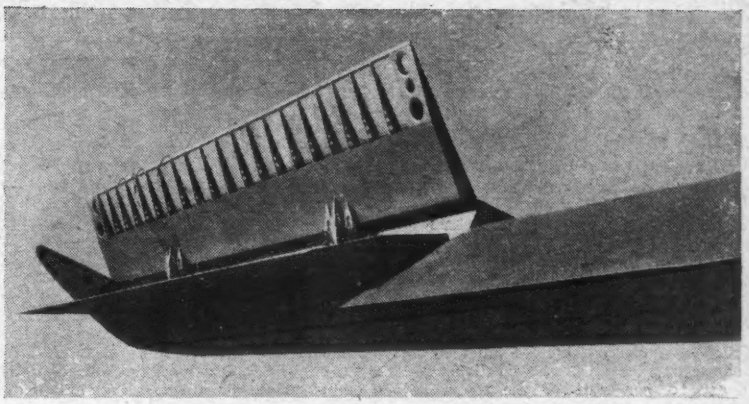


Fig. 4. The movable control surfaces at the wing-tip of the XB-35.

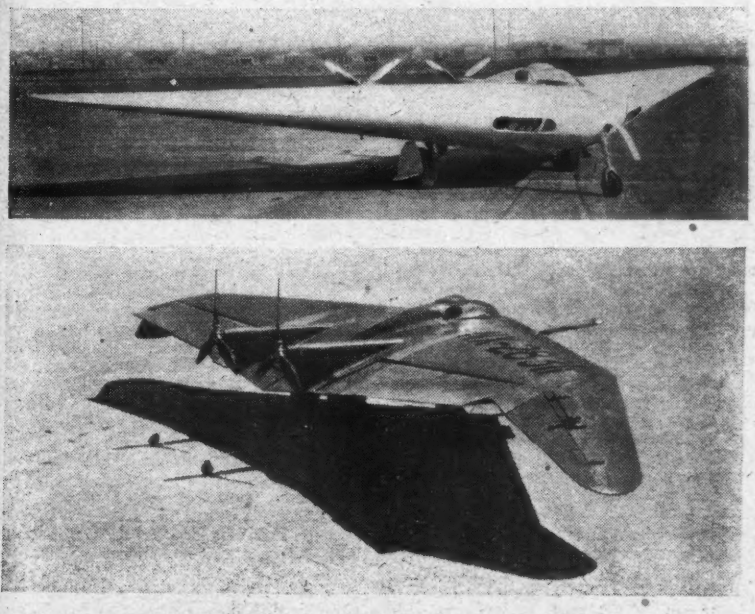


Fig. 3. The two extremes of wingform and control surface of the N.1.M. (Northrop Model 1 Mockup) which were found to be satisfactory in the air.

Lift Increase

"These advantages are summarized graphically in Fig 2 and are all based on the simple aerodynamic values obtained with all-wing aircraft; namely, that $C_{D\,min}$ equals 50 per cent of conventional; $C_{L\,max}$ equals 65 per cent of conventional. The probabilities are that the minimum parasite drag can, within a comparatively short time, be reduced, at least for commercial types, to about 40 per cent of the conventional figure and that the maximum trimmed lift coefficient ($C_{L\,max}$) may, within a similar short time, be increased to at least 75 per cent of conventional values.

"One of the most interesting devices for increasing maximum lift is, of course, the judicious use of boundary layer control in conjunction with turbo-jets or gas turbines. Another involves the development of a better combination of low pitching moment flaps and trimming devices which will permit of 'lifting ourselves by our boot straps' in a more successful manner than we have achieved to date. Model configurations tested up to this time, employing such methods, have shown improvements of 0.1 or 0.2 C_L over the figure now used of 1.5.

"A third possibility of rather unconventional nature remains to be proved in the all-wing type. This consists of placing the C.G. behind the aerodynamic centre of the wing, eliminating inherent longitudinal stability by so doing and replacing this characteristic, which heretofore we have always considered as an essential to satisfactory aircraft design by highly reliable (and perhaps duplicate) automatic pilots which take over the function of stability from the airframe and may perhaps do a better job of maintaining the proper attitude than the present classical method. While unconventional and possibly a bit horrifying to those unaccustomed to the idea, it may

have practical application to very large aircraft where the pilot's skill and strength are largely supplanted by mechanical means of one sort or another, and wherein the pilot controls the mechanism which in turn places the aircraft at the desired attitude. If the C.G. is located aft of the aerodynamic centre, the aircraft will trim at a high angle of attack with the flaps or elevator surfaces deflected downward rather than upward from their normal position, thereby increasing the camber and rendering the whole aerofoil surface a high-lift device. It is possible that trimmed lift coefficients in the order of 2.0 may be achieved by this method, and experiments completed to date with such a device on conventional aircraft show that the C.G. may be displaced at least 10 per cent of the mean aerodynamic chord aft of a normal position without any uncomfortable results in the flying characteristics of the machine.

Fig. 5. A glider version of the XP-79 with fixed landing gear shown during one of the early rocket-powered flights.

"When these improvements in C_{Lmax} and C_{Dmin} can be realized, further startling gains in performance will accrue. It would seem, however, that the present accomplishments offer sufficient incentive to warrant all they have cost in time, effort and money, and that the question, 'why bother with all-wing aircraft?' is already well answered.

Interference Elimination

"There are other major advantages of the all-wing type which cannot be so definitely evaluated but which can and do contribute appreciably to improvement in efficiency and range. Two of these, namely, the elimination of jet-tail surface interference and the possible elimination of wing-tail surface shock wave interference, have already been mentioned. The third, and the most immediately applicable to designs of the near future, is the improved adaptability of all-wing types to the distribution of major items of weight empty and useful load over the span of the wing. While such distribution can be made to a limited extent in conventional aircraft, it can be much more fully accomplished in the all-wing type. Such weight distribution results in substantial savings in structural weight which have important effects on the ratio of gross weight at take-off to landing weight. An analysis of the range formula indicates that this ratio is one of the most important range parameters. Competent authority has shown that distribution of fuel in the wings instead of the fuselage of a large conventional modern transport would allow an increase in gross weight of 16 per cent without increase to weight empty, with a corresponding increase in range up to 30 per cent.

"It is fairly obvious that the all-wing type provides comparative structural simplicity, plus the possibility of structural material distribution in a most effective way at maximum distances from the neutral axis, plus an opportunity to stow power plant, fuel and pay-load at desirable intervals along the span of the wing, which cannot be equalled in conventional types. These matters are rather intangible and difficult to illustrate by numerical relationships. They depend to a large extent on the type and size of the aircraft, what it is designed to carry, and what the desired high speed may be."

ALL-WING AIRCRAFT

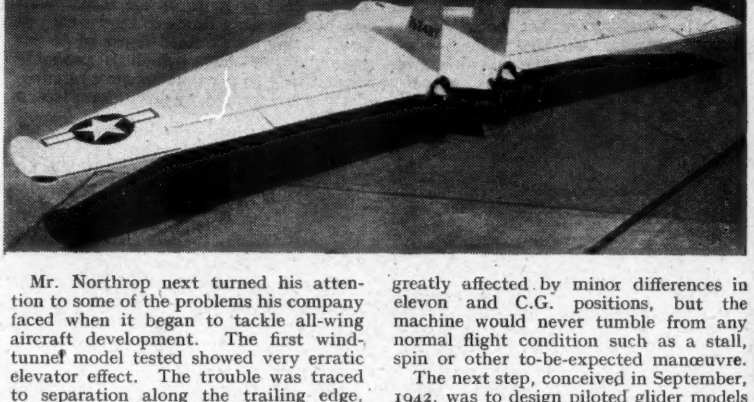


Fig. 6. (Below) The Northrop XP-79B turbo-jet flying scale model.

Mr. Northrop next turned his attention to some of the problems his company faced when it began to tackle all-wing aircraft development. The first wind-tunnel model tested showed very erratic elevator effect. The trouble was traced to separation along the trailing edge, apparently due to the plan form configuration. A simple addition of ten per cent to the chord length almost completely eliminated the difficulty.

It was soon determined that data applicable to conventional wings were unreliable for the degree of sweepback required, and a whole new technique had to be developed to determine the limits within which taper ratio, sweepback and thickness ratio could be combined for satisfactory results. All were explored on a series of wind-tunnel models, and when a reasonably satisfactory group of configurations had been determined, it was decided to build the first piloted flying wing, the N1M (Northrop Model 1 Mockup). This machine provided for changes in plan form, sweepback, dihedral, tip configuration, C.G. location, and control surface arrangement. Fig. 3 shows two extremes of arrangement in which this machine was found satisfactory in flight. The principal early troubles related to cooling of the small air-cooled engines, which were buried in the wing. This machine had made more than 200 flights, and the control which gave the most trouble was the rudder. Many rudder configurations were tried, but in the end the best and most practical was found to be the plain split flap used as a drag-producing device. It was later combined with the trimming surface needed to counteract the diving moment of the landing flaps, forming movable control surfaces at the wing tips of the XB-35, as shown in Fig. 4.

The N9M

Four machines of the next type, the N9M, were built and tested. They were flying models of the XB-35, but were, of course, single-seaters with twin pusher engines. The first was completed and tested on December 27th, 1942. After completing some 30 hours' testing it eventually crashed and the pilot was killed. It was assumed that it got into a spin. Subsequent models, over hundreds of hours, gave no trouble, and the low-speed stall and spin tests with rear C.G. position were accomplished without further difficulty.

Wind-tunnel model tests indicated that "tumbling" characteristics (tumbling is rotation about the pitch axis—ED.) were greatly affected by minor differences in elevon and C.G. positions, but the machine would never tumble from any normal flight condition such as a stall, spin or other to-be-expected manœuvre.

The next step, conceived in September, 1942, was to design piloted glider models of a high-speed fighter using liquid-rocket motors. The small size made it necessary for the pilot to lie prone. Three such gliders were built. The first had skids for car tow but was too heavy to enable a car to get it up to flying speed. The second had a detachable trolley, which was not a success. The third had a fixed undercarriage, which spoilt the clean lines and added weight, but did enable the glider to be towed off, and it made a number of successful flights.

As the airframe of the XP-79 was considered suitable for the rocket motors long before these had been sufficiently developed, it was decided to build a modified version, the XP-79B, which had two Westinghouse B-19 turbo jets. The pilot flew this machine successfully for 15 minutes on September 12th, 1945, and

ALL-WING AIRCRAFT

executed a number of manœuvres. The machine then started a slow roll, from which it did not recover but hit the ground in a steep vertical spin. It was thought that an electrically-controlled trim tab in the lateral controls had become deranged and overpowered the pilot.

Next in the Northrop programme came the building of some flying bombs. The first of these was tested as a pilot-controlled glider. In spite of a number of "bumps" on its surface, designed to carry standard 2,000-lb demolition bombs, it had good flight characteristics, but landing it was difficult. It had small, low-pressure wheels which protruded but a few inches below the bomb-shaped bumps, and the ground cushion caused by the close proximity of the wing to the ground reduced the drag and increased the lift. In spite of anything the pilot could do, the machine would rise to a height of 8 or 10 feet, stall and flop down out of control without doing damage either to itself or to the pilot. The only way was to fly it on to the ground at high speed.

(*To be continued next week*)

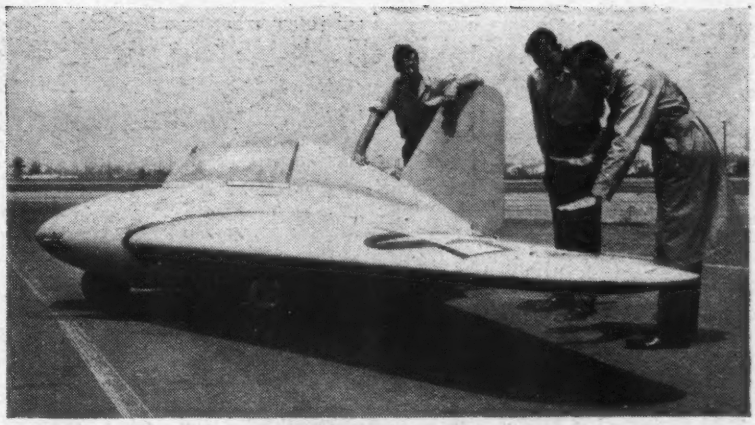


Fig. 7. The pilot-controlled glider model for the buzz bomb.

GREETINGS AND A NEW PRESIDENT

A TELEGRAM was sent by the president of the R.Ae.S., Sir Frederick Handley Page, to Mr. Orville Wright, the text of which was as follows: "On May 29th, 1947, your distinguished countryman, John K. Northrop, will read the 35th Wilbur Wright Memorial Lecture on 'The Development of All-wing Aircraft.' The reading of this annual lecture is a constant reminder of those early years of this century when you and your brother laid down so clearly, yet so simply, the firm foundations of the art of flying upon which must ultimately be built that structure for world peace which can never be destroyed."

To this Mr. Orville Wright replied: "Heartiest greetings to the society and to all assembled to hear my esteemed fellow countryman Northrop deliver the 35th Wilbur Wright Lecture. I believe Mr. Northrop will bring you a good message on matters useful in peace."

Telegrams were exchanged between the Royal Aeronautical Society and the Institute of the Aeronautical Sciences, the American equivalent of the R.Ae.S.

Dr. Roxbee Cox Elected

Sir Frederick Handley Page announced to the assembly that at a council meeting held that day Dr. H. Roxbee Cox had been elected president of the society for 1947-48, an announcement which was greeted with applause. Dr. Roxbee Cox is probably the youngest president the Royal Aeronautical Society has ever had, as he celebrates his 45th birthday to-morrow. In congratulating him on the honour shown him by the R.Ae.S., *Flight* also wishes him "Many happy returns of the day." Now Director of the National Gas Turbine Establishment, Dr. Roxbee Cox has held many responsible posts since he left the Imperial College. He has worked on airships at Cardington, been in the Airworthiness Department at Farnborough, and Principal Scientific Officer, Aerodynamics Department. During the war he became Deputy-Director of Scientific Research, specializing on jet propulsion. In 1940 he read the Wilbur Wright Memorial Lecture.

AIRBORNE TREES

AS a gesture from the British Commonwealth Occupation Forces Air Group, to assist the Japanese in their forestry programme, 120 young pine trees, accompanied by leaflets and gift vouchers, have been dropped by an R.A.F. Dakota in the Yamaguchi Prefecture of Japan.

B.A.L.P.A. BALL

AT the Morant Hall, Brockenhurst, Hants, the Hythe branch of the British Air Line Pilots' Association staged a ball on Wednesday, May 28th. Capts. Brand, Glover and Colvin, and First Officer Pallet are to be congratulated on organizing an excellently conceived and pleasantly informal affair, which brought together pilots from Hythe and nearby Hurn, and visitors from other bases, under the best circumstances.

It was a pleasant and acceptable change to hear the praises of boats sung so loudly and from those best qualified to raise their voices on the subject. We may yet find that real comfort and comparative speed will triumph over medium comfort and maximum speed in the minds of potential airline route passengers. Even over the Atlantic there is a distinct psychological and natural bias in favour of airborne bottoms rather than wheels.

V.R. PROGRESS

THERE are still vacancies for qualified pilots in the newly formed R.A.F. Volunteer Reserve. Eleven Reserve Flying Schools have already been established, and at present are equipped with Tiger Moths. These schools are located at: Woodley (Reading), Perth, Derby, Brough (Hull), Cambridge, Sywell (Northampton), Wolverhampton, Desford (Leicester), Rochester, Panshanger (near Hertford), and Fairoaks (Surrey). Reserve Centres attached to the latter two airfields are at Stanmore Park and Chessington, Surrey.

SUPERFORTRESS VISITORS

TWO demonstration flights, covering most of England and parts of Scotland, Wales and Northern Ireland, will be made by a squadron of Boeing Superfortresses (B-29s) during their goodwill and training visit to the Royal Air Force between June 9th and 16th. Nine aircraft will make these flights in formation at a height of 2,000-3,000ft; they will operate from the R.A.F. Station at Marham, in Norfolk.

The first demonstration will take place on Wednesday, June 11th, between 10 a.m. and 1.30 p.m. approximately, the route being: Marham, Lea Reservoir, Croydon, Thames Ditton, along the Thames to Erith, Beachy Head, Brighton, Portsmouth, Bournemouth, Lyme Regis, Exeter, Torquay, along the coast to Plymouth, Swansea, Cardiff, Bristol, Oxford, Marham. In the flight over London the formation will pass over Central London twice, from north-east to south-west and from west to east.

The second flight on Saturday, June 14th, will take place approximately between 2.30 p.m. and 7.0 p.m., and the route will be: Marham, Birmingham, Sheffield, Leeds, Bradford, Manchester, Liverpool, Barrow, Point of Ayre, Ballyquintin Point, Belfast, Prestwick, Glasgow, Grangemouth, Edinburgh, then coastwise turning in over Newcastle, Sunderland and Middlesbrough, Flamborough Head, Hull, Marham.

SECRET TRIALS

FROM June 2nd and lasting for fourteen days, secret trials of naval aircraft are being carried out over an area contained along a track drawn through West Drayton, Middlesex (51° 31′ N. 00° 28′ W.) and extending up to ten nautical miles east and west of this point. Naval aircraft will be flying at heights between 3,000 and 15,000ft, and the trials will include diving and climbing between the heights and positions mentioned. A *Notice to Airmen* warns pilots to exercise particular caution when flying in the vicinity of the area given.

CIVIL AVIATION NEWS

IN DOUBLE HARNESS: 2,000 gallons of petrol are carried in this tanker Lancaster seen here refuelling the machine A. V-M. Bennett and Sir Alan Cobham flew non-stop to Bermuda in 20 hrs. 1,800 gallons were taken on board on the outward trip and 1,600 gallons on the return journey.

Halifax Tramp's Journeyings : B.S.A.A.C. Tries Flight Refuelling Over Azores : B.A.L.P.A. Pension Scheme

WORLD AIR TRAMP RETURNS

DR. GRAHAM HUMBY, the managing director of London Aero and Motor Services, was due to arrive back at Stansted airfield on June 4th after his round-the-world freight tramp flight. Dr. Humby's return on Wednesday coincides with the installation of Customs facilities at Stansted for the clearance of freight, and it is expected that passenger Customs clearance will also be available there very shortly.

On his way back to England Dr. Humby, who was flying as second pilot to Capt. Thiele, D.S.O., D.F.C., in the converted Handley Page Halifax, *Port of Sydney*, sent a message containing the news that amongst his load was seven tons of dripping sent from the people of Sydney, Australia, to the people of Great Britain.

The trip, believed to be the first British air tramp, started, as mentioned in *Flight* of April 24th, from Stansted airfield on April 23rd, and has covered Canada, America, Australia, India and many of the smaller islands on the route. We understand that London Aero and Motor Services propose to open a branch of the organization in Sydney and another in Johannesburg, South Africa. With these two bases, plus the one already in operation in England, the company will be in a position to handle freight to any part of the world. Six machines are to be stationed in South Africa and Australia, with a reserve of an additional ten machines which will be ready for switching to the areas where peak loadings are expected.

One unusual load picked up by Dr. Humby during his tour was seven tons of empty beer bottles in Suva for transport to the New Zealand breweries, who had refused further supplies of beer to the Fiji residents until the empties were returned.

Dr. Humby informed a *Flight* correspondent in Australia that the trip out was completely uneventful, and no hitch, incident or even delay happened to upset his programme. After investigating all types of aircraft available, both British and American, Dr Humby is satisfied that the Halifax was the only one suitable for his purpose. It could handle seven-ton loads in its 1,000 cu ft of space over 1,400-mile legs, at an economical figure which permitted the company to fix its freight charges on the basis of 1s 5d per ton mile.

One interesting point of L.A.M.S.'s organization is the fact that captains of aircraft are empowered to make direct deals with customers over freight charges, as do skippers of tramp steamers. This, it has been found, reduces overhead and administrative charges to a minimum. It is stated that in both the South African and Australian companies to be formed, the whole of the staff, except for a few key men, will be selected in the countries concerned, and it is hoped that the Australian organization will be in active operation by September. Dr. Humby believes there is more money in handling freight rather than passengers because there is more of it, and a far greater load can be carried per aircraft.

FLIGHT REFUELLING PROVING TRIALS

BRITISH SOUTH AMERICAN AIRWAYS CORPORATION has started flight refuelling trials, which are to last over a period of three months, with one round trip to Bermuda and back each week. The first air refuelling flight of these trials started on Wedensday, May 28th, when a Lancaster aircraft, piloted by A.V-M. Bennett, left London Airport to fly via the Azores to Bermuda. Accompanying A.V-M. Bennett on this flight was Sir Alan Cobham, managing director of Flight Refuelling, Ltd., and the chief engineers of B.S.A.A. and Flight Refuelling, Ltd.

Lancasters capable of carrying 2,000 gallons of petrol are also being used as tankers, and these were to rendezvous with A.V-M. Bennett's machine over the Azores. It was planned to transfer 1,700 gallons of fuel between the two aircraft in the air whilst they cruised at 160 m.p.h. The operation was expected to be completed in 15 min.

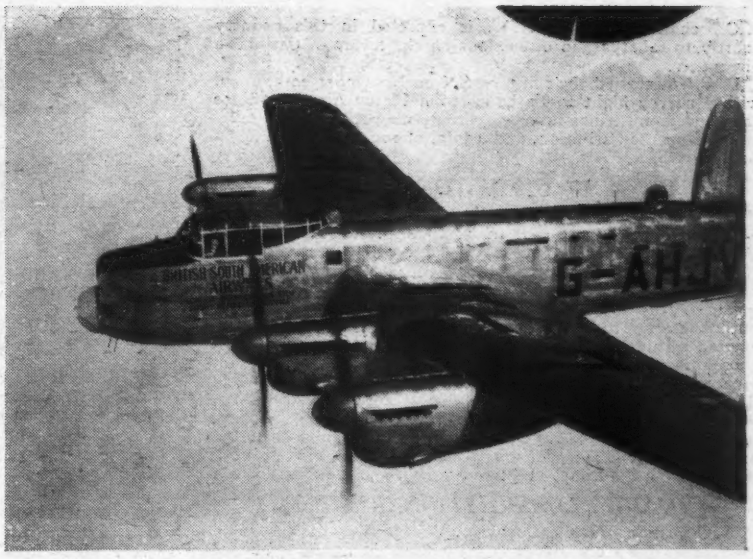
The main idea behind the B.S.A.A. flight refuelling tests is to ascertain the feasibility of operating a non-stop service between London and Bermuda, via the Azores, with flight refuelling taking place over the Azores. An alternative suggestion put forward is that the airliner might land at the Azores, refuel, and then be accompanied by the tanker for some 400-500 miles westward across the Atlantic, where it would then be refuelled in the air, thus allowing a greater payload to be carried.

It is hoped that at the end of the three months trial period

enough data will have been collected by B.S.A.A to lay down the best method to be used on a regular service.

After a successful round trip to Bermuda A.V-M. Bennett's Lancaster landed at London Airport on May 31st. At a reception the same evening, Sir Alan Cobham, speaking of the operation said, "It took 20 hr to fly the 4,000 miles to Bermuda and 15½ on the return journey. At Santa Maria a tanker aircraft met us and we took on 1,800 gallons of fuel outgoing and 1,600 gallons incoming. I travelled in the Lancaster as an observer, and must say that had I been an ordinary passenger taking no interest in what was going on, I would never have known that anything was, in fact, happening."

"A.V-M. Bennett did a splendid job," said Sir Alan Cobham, "and we are most pleased with the results."



THIRSTY LANCASTER : The Avro Lancaster G-AHJV in which A.V-M. Bennett and Sir Alan Cobham flew non-stop to Bermuda by refuelling in flight over the Azores.

PENSION SCHEME

THE British Airlines Pilots' Association, representing 1,100 members, of whom about 75 per cent are pilots, disclose that a pension scheme for airline pilots is to come before an arbitration court, the date of which has not yet been fixed.

Mr. D. Follows, secretary of the Association, said that the scheme proposed by the Corporations and the Ministry of Civil Aviation provided for a pension of £300 per annum on retirement at the age of 40, rising to £550 on retirement at the age of 50. The present B.O.A.C. scheme, instituted before nationalization, provides senior captains with pensions of £330 per annum at 40 years of age, and £605 per annum at 50 years of age.

The Association is prepared to accept a nominally contributory scheme and a fixed pension, but states that it cannot accept figures put forward by the Corporations as just or reasonable, particularly in the light of discrepancies amongst the present pensions of pilots. The Association proposes that pensions should range from £400 to £800, whilst the Corporations are prepared to accept proposals concerning salary scales but will not alter their offer on pensions.

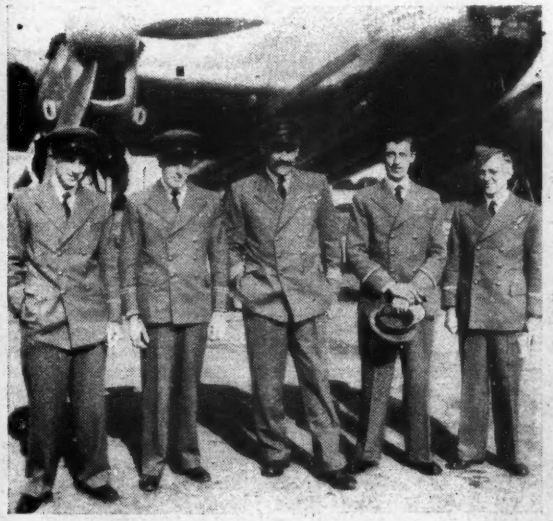
PAN AMERICAN ANNIVERSARY

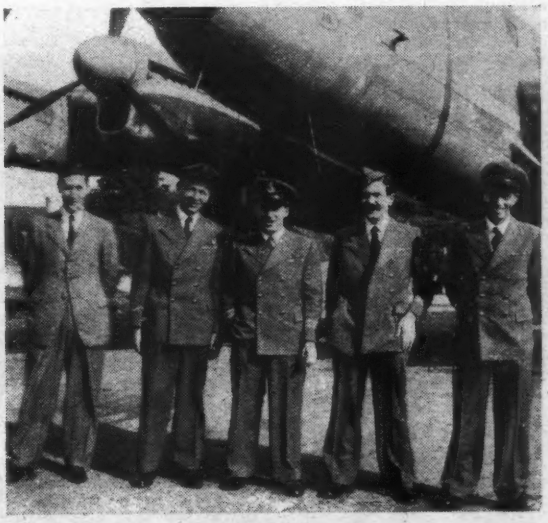
COMMEMORATING the first anniversary of its regularly scheduled commercial air service into London Airport inaugurated in May of last year, Pan American Airways announce that it carried 9,120 passengers on 368 flights from London to New York during that period. 5,800 passengers travelled on the reverse route. From June 27th Pan American are to fly twenty-two trans-Atlantic flights weekly comprising fourteen a week from London, three from Brussels, two from Lisbon, two from Johannesburg and one from Karachi, India.

B.W.I.A. LINK WITH B.S.A.A.

COMMERCIAL flying in the Caribbean area may be expected to encompass a wider sphere of operations, following the disclosure early this year that British South American Airways have taken a substantial block of British West Indian Airways' shares, which it is understood were formerly held by the Trinidad Government. B.S.A.A. are to act as technical advisers and provide general supervision; the two companies will work to perfect the network of trunk and feeder routes in the West Indies. The ultimate goal, we understand, is an airline serving all West Indian communities and linking with the main trunk routes of the world.

We are informed by B.S.A.A. that Sir Lennox O'Reilly,





TANKER CREWS : Shown here are the crews of the two tanker aircraft stationed at the Azores to refuel the B.S.A.A. Lancaster on its non-stop flight to Bermuda. Capt. David Prowse, O.B.E., is centre in the group on the left, and Capt. S. R. Jeffrey (centre) in the photograph on the right.

K.C., chairman of B.W.I.A., is expected in this country shortly to take part in discussions on the future of Caribbean air routes.

B.W.I.A. started their first service on November 20th, 1940, with a survey flight to Barbados from Piarco Airport. Since then development has involved a route network of 3,600 miles throughout the Caribbean, and a total of 100,000 miles is flown each month.

HEATHROW OPEN TO THE PUBLIC

ON Sunday, June 1st, the public enclosure at London Airport, Heathrow, was opened to the public for the first time. The enclosure is near to the control tower and close to one of the main taxi tracks, and an estimated 3,000 people who paid admission had a grand view of aircraft arriving at and departing from Heathrow. A running commentary on inbound and outbound aircraft was broadcast from the control tower, interspersed with music when no aircraft were to be seen. Amongst those present on Sunday were the Mayor and Mayoress of Hounslow, accompanied by local dignitaries of the surrounding districts of Feltham, Hayes, Hendon, Uxbridge and Staines, who were given flights in a B.O.A.C. York aircraft to commemorate the occasion. From now on the public enclosure at Heathrow will be open on weekdays from 2 o'clock until dusk, and on Saturdays and Sundays from 10 a.m. until dusk.

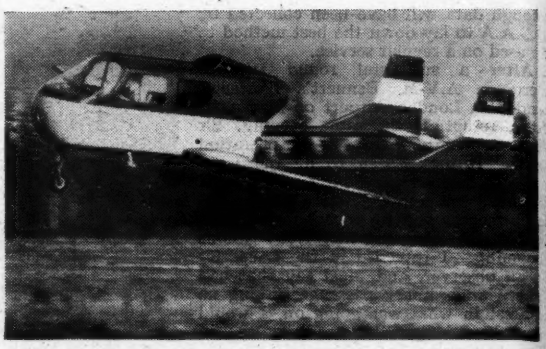
DESIGN COMPETITION RESULT

TWO years ago a Mr. Donald J. Wheeler was the successful contestant from among 3,345 entries in an international professional design competition for personal aircraft. On April 23rd, at Tacoma, Washington, the *Wheelair*, the first of two prototypes built to his design by Puget Pacific Planes Inc., of which he is engineering vice-president, made a successful first flight. It is an all-metal, two-control, tricycle pusher type with a roomy car-like cabin to seat four, and accommodation in addition for 160 lb of luggage. With a 190 h.p. Lycoming engine the maximum speed is 140 m.p.h. and the cruising speed 125 m.p.h. The landing speed of 55 m.p.h. is on the high side for personal aircraft, and the wing and power loadings are 13.95 lb/sq ft and 13.1 lb/b.h.p. respectively. The empty weight is 1,350 lb and the gross weight 2,500 lb. The cruising range is 600 miles at 12 m.p.g. consumption.

RE-START

IT is gratifying to hear of air services getting into their stride after the war years, and we are pleased to recount that Birkett Air Services, Ltd., have now been able to recommence their activities at Croydon Airport. At present only a small fleet, consisting of two de Havilland Rapides and one de Havilland Leopard Moth, are in use, but it is hoped to augment these later by the addition of a Percival Q.6 and an Airspeed Consul.

Birkett Air Services operated for seven years before the war, charter flying and carrying out contracts for the Air Ministry, including the operation of the No. 29 (E and R) Flying Training School, of Luton, Beds.



TWO-CONTROL PUSHER: This four-seater, all-metal *Wheelair* IIIA is seen taking off on its first flight in the U.S.A. Power is supplied by a 190 h.p. Lycoming engine giving a maximum speed of 140 m.p.h.

FAST DELIVERY FLIGHT

COUNT GUSTAV VON ROFEN, Commander-in-Chief of the Abyssinian Air Force, has completed a remarkable delivery flight from Sweden (Linköping) non-stop to Addis Ababa in a SAAB Safir, powered by a de Havilland Gipsy Major 10.

The flight, which was via Vienna, Rome, Tripoli and Khartoum, took 31 hours; 2 hours less than planned. Fuel for 36 hours was carried in extra tanks in the cabin, together with two cold chickens, one kilogram of chocolate and three flasks of coffee to sustain the pilot. The Safir is one purchased by His Majesty the Emperor Haile Selassie.

A description and photograph of the SAAB-91 Safir appeared in our issue of April 3rd, in the article "Swedish Wings."

BREVITIES

W/C. E. A. Gibson, director of air transport in the R.N.Z.A.F., has been appointed the Director of Civil Aviation in New Zealand.

* * *

International Airways at Croydon have taken delivery of a third Consul. The company's Gemini recently flew to Lausanne, the outward leg taking 4 hr. 40 min. and the return 4 hr. 35 min. Petrol consumption averaged only 9 gall. per hour.

* * *

The Bristol Wayfarer, when making its first demonstration flight in Australia, had the misfortune to lose a hatch which had been insecurely fastened, soon after take-off. The elevators were damaged but the aircraft was landed safely.

* * *

An airport for Adelaide is under construction at West Torrens of the I.C.A.O. size classification "medium range regular airport." One runway will be 2,150 yd, and the other two will be 1,650 yd. It is expected that the airport will eventually be able to cater for 500 movements daily.

* * *

Further rules affecting pilots approaching London, Northolt and Bovingdon airports are published in *Notice to Airmen* No. 129 of the year 1947, which cancels previous *Notices to Airmen* Nos. 167 and 172 of 1946.

* * *

Aircraft Advisors Inc., an American firm dealing in technical services in collaboration with Canadair, Ltd., of Montreal, Canada, have announced an offer of a complete inventory of C.47 and DC-3 spare parts. Lists and prices of spare parts are being circulated amongst all foreign operators of C.47 and DC-3 aircraft.

* * *

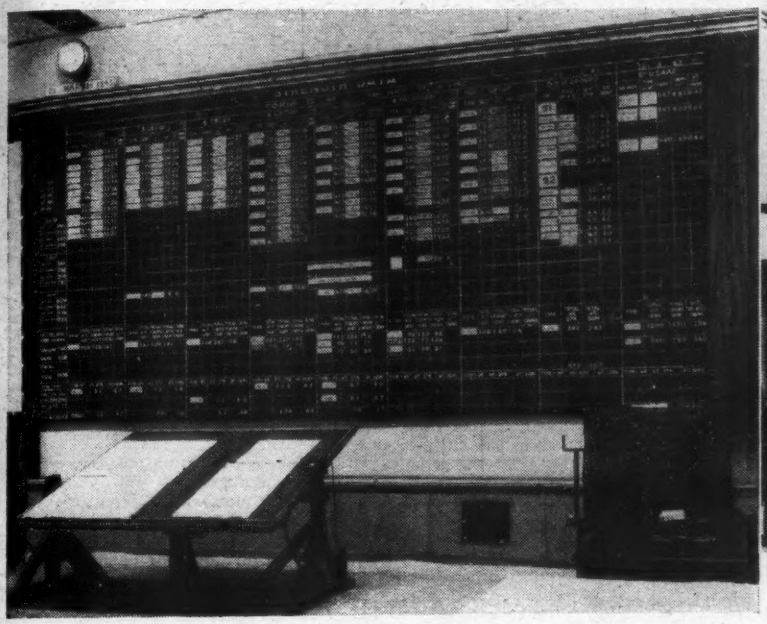
Six Swedish girls have been selected out of 250 applicants for employment as air hostesses by American Overseas Airlines in Stockholm.

* * *

A successful conclusion is expected of the talks between the Afghan Government and a delegation from the Indian Interim Government for an air agreement to link Kabul with Peshawar and Kandahar with Quetta.

AIR TRAMP'S CREW: Dr. Humby (second from right) with the crew of the Halifax, *Port of Sydney*, photographed at Mascot, Australia. **(See p.532).**

HISTORY ON VIEW



"Flight" photographs.

The great board facing the C.-in-C.'s desk, showing the strength and serviceability of all units of Bomber Command. On the right is the airfield serviceability map which, by a system of coloured lights, shows unserviceable, "doubtful" and serviceable bases

Bomber Command Ops. Room Preserved in Operational State

SPEAKING last week in his subterranean Operations Room at High Wycombe, Air Marshal Sir Hugh Saunders, K.B.E., C.B., M.C., D.F.C., M.M., Air Officer Commanding-in-Chief, Bomber Command, outlined the tasks now confronting his Command. These, he said, were first reorganization, secondly training and thirdly, the development of tactics suitable for the employment of new weapons and new aircraft types. Our aim was a small, but very effective, bomber force, and with this in view equipment must undergo continuous change.

The historic Operations Room has been set up more or less as it was on March 21st, 1945—a day on which the Command was operating at its maximum effort in both day and night attacks. Against this background the planning of a night's operations was explained to us by officers of the C.-in-C.'s staff.

The day's planning started with the Commander-in-Chief's morning conference at 0900 hrs. This was attended by the Deputy C.-in-C., who was responsible for detail planning; the S.A.S.O., who set the operational machinery in motion; a Naval staff officer; Chief Intelligence Officer; Senior Met. Officer; the Ops. Room staff and liaison officers, including those from the U.S. forces.

The Met. officer having made his forecast, the area of the attack was decided. Selection of the particular target or targets was made with the aid of special boards showing priorities. At the time in question these were in the following order: army support, oil, area targets, transport, industrial installations, jet fighter factories and naval targets. It was, in fact, decided to make two attacks—on Hamburg and on Bruchstrasse—the former to be marked by No. 5 Group, using their own technique, and the latter with the aid of "Oboe."

The Chief Intelligence Officer was called upon to give the C.-in-C. details of the target, and with the assistance of the Research Section, the number of aircraft required and the type of bombs to be dropped were determined.

It now fell to the C.-in-C. to decide upon "H" hour (time over target), this being dependent upon the weather over base and target, tactics, the effort foreseen for the following day, distance, the amount of darkness, and the necessity for linking up all the night's operations to produce the maximum of confusion among the defences. "Other operations" (e.g., mining) having been settled, the C.-in-C. left the conference and preliminary warning orders were passed to Groups.

Detailed planning was now commenced by the Ops. staff. Routes were worked out, aiming points selected, protection of the bombing force arranged (with the aid of aircraft carrying radar counter-measures) and the Forms "A" (operational orders) were sent out.

In the afternoon, at 1500 hrs, a final conference was called for the study of weather conditions and for final decisions to be taken. This meeting also served for the planning of the following day's operations in daylight.

A huge coloured map at the far end of the Operations Room showed—and still shows—the routes taken by the main bomber streams, diversionary activities, restricted areas, etc., and an even larger board presents clearly the state of the aircraft of all Groups. The airfield serviceability map can be lighted to show the state of the bomber bases at the time of the bombers' return at 0300 hr on March 22nd.

Adjacent to the Ops. Room are smaller rooms in which have been set up models to demonstrate the working of H2S and to simulate an attack on the oil works of the Deutsche Petroleum A.G. at Hamburg. To F/L. Jarvis, D.F.M., most of the credit is due for the construction of this second model, which gives a remarkably accurate impression of flare illumination, target marking, flak, bomb bursts, and even an attack by a night fighter. As a finale, two of the oil tanks explode in a most satisfactory manner.

FAIR OAKS CELEBRATION

FAIR OAKS AERO CLUB, at Chobham, Surrey, who are in the happy position of having very pleasant premises in a country house near the airfield, had a special reason for holding their monthly dance which took place on May 31st. Tommy Rose, with other members and guests, celebrated the capture of the imposing Manx Air Derby Challenge Trophy (photograph on p. 521) which, with a small replica, now decorates the club bar.

It was particularly pleasant on this fine evening to be able to extend the party on to the terrace, and the strains of R.A.F. songs floated out over the lawns as the cup was filled with champagne, Guinness, and no doubt other ingredients as well.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

R.A.F.V.R. ENLISTMENTS

Is There a Certain Slackness ?

IT is with amazement that I and several other pre-war members of the original R.A.F.V.R. regard the notices concerning the enlistment for the R.A.F.V.R. which are appearing frequently in the Press.

No communications have reached us apart from the normal application for enrolment forms, and even these were not sent until a letter of enquiry had been forwarded to the authorities.

It is a great pity if the revival of the R.A.F.V.R. is to proceed on these lines. G. R. WHITTARD.

WHAT'S IN A NAME

Suitability to Outline and Purpose ?

AFTER seeing Mr. Delfont's letter in your recent issue, I am prompted to agree with him. The name "Supermarine Attacker" does not, in my opinion, do justice to what augers to be an outstanding machine. Repeat it over to yourself two or three times and you end with a noise like a traction engine.

No. My choice would be "Supermarine Shark," a name which not only alliterates, as all good names should, but conjures up a vision of the actual machine, for the E 10/44, as a glance at a photograph will show, does look like a shark. Of course, "Shark" has been used before, most names have these days, but it has never before been so applicable to the aircraft as it would be in this case.

Should the powers-that-be decide, however, that the adoption of this name would mess up their card index systems, or entail reorganization of their methods, the Admiralty might consider this as an appropriate name for the naval version.

G. ELLIS.

BRITISH JETS OVER EUROPE

Fast Flights are Not Official Records

WITH reference to your edition of May 22nd, in which on page 471 under the heading "News in Brief" appears reference to a flight of 1,312 km between London and Norrköping by G/C. Cunningham in a Vampire at an average speed of 659 km per hour. This you state is the highest speed reached in Europe on such a long flight, also that it is believed that this constitutes a new European speed record.

Without attempting to belittle this very fine flight, we would point out that on April 21st a Meteor IV was flown from Brussels to Copenhagen, a distance of 800 km (500 miles), at an average speed of 1,008 km per hour (630 m.p.h.) and also on August 1st, 1946, a Meteor III flew the 2,000 miles from Melbourne to Darwin at an average speed of 430 m.p.h.

We trust you will forgive us for pointing this out but we do feel that the event referred to does not constitute an official record. E. S. GREENWOOD, Gloster Aircraft Co., Ltd.

BLIND-APPROACH PRESENTATION

Radar the Only Aid

I HAVE been immensely interested in the recent articles on the subject of instrument flying and bad weather flying written by "Vertigo" and the author of "Blind-Approach Presentation." Both of these writers pay great attention to the psychological aspect of the problems involved; and how right they are to do so.

Particularly true to life was "Vertigo's" description of the feelings of a pilot letting down through a turbulent "ten-tenths," with thirty or so lives depending upon him alone.

It is because of these feelings that I do not agree with the idea of a little cinema show to help the pilot come down the beam. He should know that what he saw was false (particularly at night!), and that would produce the tingly sensation at the base of the spine caused by, say, the failure to get a Q.F.E. before coming in to land. He would, in fact, trust the film as little as he would trust an altimeter that he knew to be incorrectly set.

As a comparatively inexperienced civil pilot (I completed about 1,000 hours before rejoining the R.A.F.), what I would like to see when doing a blind approach is an actual view of the runway in the form of a flare-path reproduced in miniature on the instrument panel. Why a flare path? Because with the aid of modern radar it should be a fairly simple matter to design such a presentation, and because the transition from the miniature flare path to the real one when landing at night would be quick and natural.

Radar being the only device so far known to man that enables him to "see" objects made invisible by darkness or cloud, I feel that it is the obvious solution to the vital problem of the blind landing. C. B. G. R.

Deviation Presented in Continuous Form

IN reply to "Vertigo's" letter in *Flight* of May 22nd, may I draw attention to the fact that your correspondent does not appear to have interpreted the facts quite correctly? The degree, direction and rate of deviation from the beam are most definitely intended to be presented in continuous form, throughout the period of controlled approach. For instance, a swing off course to starboard initiates a partial eclipse of the range "picture" at the right-hand edge, and thereafter the extent and rate of such eclipse is directly proportional to the movements of the aircraft in relation to the beam. There is not, at any time, a need for the pilot to divert his attention from the range picture.

Concerning the use of continuous range transmission systems for satisfactory operation of the film speed control, it is agreed that such a method is inherently more accurate and the proposed apparatus is designed to take ultimate advantage of the fact. In the meantime, it by no means follows that operation on the established marker beacon system will prove inadequate, and it is proposed to go ahead with initial development rather than "mark time" until the arrival of a satisfactory short-range version of DME.

Finally, the relative ease with which modern aircraft may be landed in normal daylight conditions is very much a matter of opinion. However, in this, as in other comparable spheres of activity, the high degree of skill achieved by constant practice is the result of perfect muscular and nervous co-ordination of the senses arising as the direct result of natural stereoscopic colour vision; hence the reason for the introduction of the new system. G. H. PARKES (Major).

PRESSURE REFUELLING

Transfer Pipe as a Filling Gallery

MR. BASIL JACKSON, in his article on "Servicing and Maintenance" in your issue of May 8th, 1947, raised a point with regard to pressure fuelling which, I feel, requires some remark. I may say that I am in full agreement with Mr. Jackson regarding the necessity for high-speed ground fuelling, and Flight Refuelling, Limited, have produced a series of shut-off valves which go far in making this possible. We have, however, found in the industry several misconceptions along the lines expressed by Mr. Jackson, and clarification of these points may assist those interested in applying the principles.

It is not only possible to refuel all tanks simultaneously by means of one ground connection, but the system has, in fact, been embodied on several aircraft. The fact that modern fuelling tenders are equipped with *two* hoses, each able to deliver 85 gallons per minute, and that this rate of delivery will certainly be greatly exceeded in the near future, tends rather to nullify this advantage, for an aircraft with *two* ground connections can be refuelled in half the time by one tender as against the aircraft with only one connection.

Another point regarding the use of the balance pipe as the filling gallery is that most modern aircraft dispense with the balance pipe and embody a fuel-transfer pipe in which the transfer is controlled by an integral boost pump. The necessity for the attachment of the balance pipe to be made to the bottoms of the tanks as against the connection of the transfer pipe to the tops of the tanks dictates this alteration, as a fracture of the balance pipe entails the loss of all fuel, while the fracture of the transfer pipe only entails the loss of the fuel in the pipe, and probably some few gallons from the top of the tank. With the pressures met with in high-speed ground fuelling, fracture of the balance pipe, unless it was strengthened considerably (thus adding to the weight) would be more likely to occur. There is no valid reason why this transfer pipe should not be used as a filling gallery, thus dispensing with the weight and space requirement of a separate gallery, but at present aircraft fitted for pressure fuelling normally embody a separate filling gallery.

S/L. H. R. BUNN, M.B.E.

SERVICE AVIATION

"Flight" photograph

ENGINE TEST: The Bristol Centaurus eighteen-cylinder sleeve-valve engine of a Hawker Tempest II fighter-bomber of No. 33 Squadron, B.A.F.O., has a final test before a demonstration R.P. attack.

The King's Birthday

A COLOUR-HOISTING parade at which the Royal salute (the National Anthem) will be played, if a band is available, instead of the general salute, will mark the King's Birthday (June 12th) at all R.A.F. stations at home. The rest of the day will be a holiday.

Award

THE King has been graciously pleased to approve the following award:—

BRITISH EMPIRE MEDAL

Acting Corporal Robert Spencer Edmunds, R.A.F.V.R., Provost Headquarters, R.A.F., Levant.

On July 22nd, 1946, at Jerusalem, Corporal Edmunds was delivering secret mail at Army Headquarters, Palestine, on the top floor of the King David Hotel, when Jewish terrorists blew up the building. As the explosion occurred, he felt the floor cave in beneath him and he can vaguely remember falling and being struck by pieces of masonry. His next recollection was of lying on a pile of rubble. He discovered that his revolver was still attached to his lanyard, although his holster had been ripped from the webbing belt. By this time, Corporal Edmunds had more or less regained his senses and realized that the building had been blown up. He looked around and saw two Service girls stumbling towards him through the wreckage. Realizing the possibility of further falls of masonry, Corporal Edmunds made them lie down. When no more falls of debris occurred, he told them to get up and follow him from the wreckage. One of the girls found that she was unable to walk. Corporal Edmunds carried her away from the wreckage, and across the road where he handed her over to the crew of an ambulance. Afterwards, he attempted to return to find the other girl in the wrecked building but, on nearing it, was stopped by a soldier who had observed his injuries. Corporal Edmunds then lost consciousness. He was bleeding profusely from wounds in his head, hands, arms and legs. It was afterwards found that he had fallen from the sixth floor of the building after the explosion. Corporal Edmunds first concern on regaining consciousness was for the safety of the despatches he was carrying. He showed outstanding coolness, courage and a strong sense of duty throughout the incident.

Royal Air Force and Naval Aviation News and Announcements

Tribute from the R.A.F.

AT U.S.A. Memorial Day ceremonies at Brookwood Cemetery, Woking, Surrey, and Maddingley Cemetery, Cambridge, on May 30, wreaths from the R.A.F. were laid on the memorials commemorating members of the American armed forces who are now buried there.

At Maddingley, where a small detachment from No. 3 Group of Bomber Command, Mildenhall, was present, the wreath was laid by G/C. R. G. M. Collard, and G/C. J. Warburton, of No. 11 Group, Fighter Command, performed a similar duty at the Brookwood cemetery.

Naval Air Branch—E.S.C.s.

THE Admiralty is granting extended service commissions (four years) in the Air Branch of the R.N., and are prepared to consider applications from released officers who have held commissions in the R.N.R., R.N.V.R., and R.N.V.R. (A) (permanent and temporary) and who are qualified pilots or observers. Applicants must be British subjects and selection will normally be limited to officers with front-line experience and under 28 years of age.

Commissions for Ex-Regulars

OF the permanent and extended-service commissions authorized in the R.A.F. at present, over a third have been offered to ex-regular airmen. These have been selected from 1,208 permanent and 5,066 extended-service commissions. From some 30,000 applications, the R.A.F. Permanent Commission Selection Board has chosen nearly 3,000 officers for "P.C.s" and nearly 13,000 for "E.S.C.s." It is interesting to note the various branches in which the majority have been commissioned; these are:

	P.C.s.	E.S.C.s.
General Duties	225	420
Technical Engineer..	410	1,429
Technical Signals ..	135	827
Secretarial	223	931

Ninety per cent of the extended service commissions and 89 per cent of the permanent commissions given to technical engineers have gone to ex-regular airmen and in the technical signals branch the proportion is nearly as high—82 per cent and 77 per cent, respectively. In the secretarial branch ex-regular airmen have obtained 53 per cent of the extended service commissions and 60 per cent of the permanent commissions, but

SERVICE AVIATION

in the general duties branch the proportion is lower—6 per cent of the extended service commissions and 16 per cent of the permanent.

In future, ex-regular airmen on emergency commissions will still be eligible for short-service commissions, and those now holding extended-service commissions will be considered for permanent commissions. Moreover, regular airmen who have not been commissioned can obtain permanent commissions direct in ground branches, in keeping with the post-war policy of the R.A.F. that most officers must serve in the ranks before commissioning.

Burmese National Air Force

THE C.-in-C. Allied Air Forces, South-East Asia (Air Marshal Sir George Pirie) lately arrived in Rangoon to discuss with the Burmese Interim Government the provision of R.A.F. aid in forming a Burmese national air force.

Service Aircraft Colour Schemes

AT last it is learned that standard colour schemes for all R.A.F. aircraft are to be adopted. According to the type and role of the aircraft, these will be silver, dark green, anti-searchlight black, medium sea grey and white. It has also been decided to revert to the old style of roundel. Thus, the white ring will be officially reinstated and the yellow ring, which during the war enclosed the blue and red, will disappear.

New Signals Trades

FOUR new trades—air radar mechanic, ground radar mechanic, air wireless mechanic and ground wireless mechanic—have been introduced into the R.A.F. These are to be Group B trades and they will take over part of the work at present being done by the higher Group A radar mechanics and the wireless, wireless and electrical, and wireless operator mechanics, now to be known respectively as radar and wireless fitters.

Entry to these new Group B trades, which have been introduced as a temporary expedient to meet serious manning difficulties in the Group A signals trades, will be restricted to National Service entrants and to regulars unable to qualify for the Group A trades.

"Bomber" Harris in Canada

MORE than 600 serving and ex-Service members of the Royal Canadian Air Force stood and roared their approval as Marshal of the R.A.F. Sir Arthur Harris, guest of honour at an Air Force reunion dinner, told them that "without the enormous contribution Canada made to the war effort we would never have had the great bomber force we had."

Sir Arthur told the men who served under him in Bomber Command that there are few homes in Canada to-day which should not feel the deepest gratitude towards Bomber Command because of the number of lives saved on land by the efforts of the bomber units.

Admitting that losses were heavy in Bomber Command, Sir Arthur declared: "I was certain that every man lost in the Command meant the saving of the lives of 10 men on the ground. Bomber Command brought hope to those in occupied countries, for its efforts gave them courage to carry on. You of Bomber Command destroyed the German Navy—in your spare time—and were the decisive factor in Germany's defeat."

CITY OF DREAMING SPIRES: Tiger Moths of the Oxford University Air Squadron over the Colleges. Christ Church College, with Tom Tower, is in the right foreground, Magdalen College and Tower (right background), and the Sheldonian Theatre (left).

B.A.F.O., S.A.A. Meeting

AT the recent inaugural meeting of the B.A.F.O. Small Arms Association, held at Bad Lippspringe, in Germany, some 600 competitors fired 100,000 rounds of 0.303in rifle ammunition and 50,000 rounds of 0.38in revolver ammunition. Some of those with the highest scores will shoot for the R.A.F. and King's Prize championships at Bisley later in the year.

Auxiliary Expansion

GOOD news continues to come in of the expansion of the Auxiliary Air Force, now getting into its stride not only with "week-end flyers" but with "week-end fighters" and "week-end plotters."

In four areas—Edinburgh, Gloucestershire, Middlesex and the West Riding—recruiting begins very shortly for Light A.A. Auxiliary Air Force Regiment Squadrons (applications can be dealt with on June 1st), and 16 other Squadrons are planned for the near future. These A.A.F. Regiment Squadrons are affiliated to, and are located alongside, the existing Auxiliary Flying Squadrons. Each Regiment Squadron will consist of about 200 officers and men, mostly those with R.A.F. Regiment or gunnery experience. There are also vacancies for men with other qualifications, such as doctors, cooks, clerks or mechanics. Like the 20 flying squadrons—which are still welcoming volunteers—the Regiment squadrons will be front line units, fully mobile and equipped for action at a moment's notice. Their main armament will be the Bofors (40 mm.) A.A. gun.

So far only nine units of the week-end plotters have begun to form. These first nine stretch from Hull to Bournemouth, as far inland as Northampton and Nottingham. Their role is raid reporting and fighter control with operational equipment.

The twenty flying squadrons—soon to be joined by A.A.F. Regiment Squadrons—are as follows: Ulster, West Lancaster, North Riding, West Riding, South Yorkshire, Counties of Kent, Gloucester, Nottingham, London, Middlesex, Warwick, Durham, Chester, Aberdeen, Glamorgan and Surrey, Cities of London, Glasgow, Edinburgh and Manchester. The nine Air Defence Units are in Hampshire, Kent, Middlesex, Norfolk, Northampton, Nottingham, Suffolk, Sussex and East Riding.